



SEQUENCE LISTING

<110> Morgan, James Alun Wynne
Jarrett, Paul
Ellis, Debbie
Ousley, Margaret Anne

FEB 20 2004

<120> BIOLOGICAL CONTROL OF NEMATODES

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<140> 09/889,874

<141> 2001-07-23

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| Thr | Tyr | Leu | Gly | His | Gln | Arg | Val | Ala | Tyr | Thr | Gly | Thr | Thr | Gly | Thr |
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| His | Val | Leu | Thr | Leu | Ala | Thr | Asp | Arg | Tyr | Asp | Thr | Asp | Pro | Asp | Gln |
| | | 515 | | | | | 520 | | | | | 525 | | | |
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| Asp | Gly | Ser | Leu | Ile | Thr | Asp | Ala | Lys | Gly | Ala | Pro | Leu | Val | Ala | His |
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| Thr | Ala | Thr | Arg | Trp | Ala | Val | Ser | Gly | Arg | Thr | Glu | Tyr | Asp | Gly | Lys |
| | | | 580 | | | | | 585 | | | | | 590 | | |
| Gly | Gln | Pro | Val | Arg | Thr | Tyr | Pro | Pro | Phe | Phe | Leu | Asn | Ala | Trp | Gln |
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| Tyr | Leu | Ser | Asp | Asp | Ser | Ala | Arg | Gln | Asp | Leu | Asn | Ala | Asp | Thr | His |
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| Arg | Tyr | Asp | Pro | Leu | Gly | Arg | Glu | Tyr | Gln | Val | Arg | Thr | Ala | Lys | Gly |
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35 40 45
Gly Ile Pro Met Glu Gly Val Phe Ala Asn Leu His Arg Arg Pro Leu
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Ser Gln Arg Thr Val Lys Arg Leu Arg Pro Ala Val Ile Gly Ile Ser
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Arg Tyr His Arg His Pro Asn Thr Pro Thr Thr Thr Asp Glu Arg Ile
50 55 60
Thr Arg His Arg Phe Thr Leu Ser Gly Gln Leu Ala His Ser Ile Asp
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Pro Arg Leu Phe Asp Leu Gln Gln Thr Asp Asn Thr Val Asn Pro Asn
85 90 95
Met Ile Tyr Asp Thr Ala Leu Thr Gly Glu Val Val Arg Thr Arg Ser
100 105 110
Val Asp Ala Gly Asn Asp Leu Ile Leu Asn Asp Ile Thr Gly Arg Pro
115 120 125
Val Leu Ala Ile Asn Ala Thr Glu Val Thr Arg Thr Trp Gln Tyr Glu
130 135 140
Asn Asp Thr Leu Pro Gly Arg Pro Leu Ser Ile Thr Glu Gln Pro Ala
145 150 155 160
Gly Glu Ala Gly Arg Ile Thr Glu Arg Phe Val Trp Ala Gly Asn Ser
165 170 175
Gln Ala Glu Lys Asn Ser Asn Leu Ala Gly Gln Cys Val Arg His Tyr
180 185 190
Asp Thr Ala Gly Leu Asn Gln Thr Asp Ser Ile Ala Leu Asn Gly Ile
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Pro Leu Ser Val Thr Arg Gln Leu Leu Pro Asp Gly Thr Asp Ala Asp

| | | |
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| Thr Thr Asp Ala Ala Gly Asn Leu Gln Arg Val Ala Tyr Asp Val Ala | | 255 |
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| Gly Leu Leu Thr Gly Ser Trp Leu Arg Leu Ala Gly Gly Thr Glu Gln | | 270 |
| | 275 | 280 |
| Val Ile Val Lys Ser Leu Thr Tyr Ser Ala Ala Gly Gln Lys Leu Arg | | 285 |
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| Glu Glu His Gly Asn Gly Val Val Thr Thr Tyr Thr Tyr Glu Pro Glu | | 300 |
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| Gln Gly Thr Lys Val Leu Gln Asp Leu Arg Tyr Glu Tyr Asp Pro Val | | 335 |
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| Arg Asn Gln Lys Val Val Pro Glu Asn Thr Tyr Val Tyr Asp Ser Leu | | 365 |
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| Tyr Gln Leu Val Ser Ala Thr Gly Arg Glu Met Ala Asn Ile Val Gln | | 380 |
| 385 | 390 | 395 |
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| | 405 | 410 |
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| | 435 | 440 |
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| | 485 | 490 |
| Leu Leu Lys Val Ala Pro Val Val Arg Asp Gly Gln Ile Ser Asp Gln | | 495 |
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| Glu Ser Tyr Arg Tyr Asp Ala Ala Ser Gln Arg Ile Ile Lys Thr His | | 510 |
| | 515 | 520 |
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| | 530 | 535 |
| Pro Gly Leu Glu Arg His Thr Thr Ile Asn Gly Thr Thr Val Lys Glu | | 540 |
| 545 | 550 | 555 |
| Val Leu His Val Ile Thr Ile Gly Glu Ala Gly Arg Ala Gln Val Arg | | 560 |
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| Val Leu His Trp Glu Asn Gly Lys Pro Gly Ala Ile Ser Asn Asn Gln | | 575 |
| | 580 | 585 |
| Met Arg Tyr Ser Tyr Asp Asn Leu Ile Gly Ser Ser Gly Leu Glu Val | | 590 |
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| Asp Gly Asp Gly Gln Ile Ile Ser Met Glu Glu Tyr Tyr Pro Tyr Gly | | 605 |
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| Thr Val Arg Tyr Ser Gly Lys Glu Arg Asp Ala Thr Gly Leu Tyr Tyr | | 640 |
| | 645 | 650 |
| Tyr Gly Tyr Arg Tyr Tyr Gln Pro Trp Ala Gly Ser Trp Leu Ser Ala | | 655 |
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| | | 670 |

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Asp | Pro | Ala | Gly | Thr | Ile | Asp | Gly | Leu | Asn | Leu | Tyr | Arg | Met | Val | Arg |
| | | 675 | | | | | 680 | | | | | 685 | | | |
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| 705 | | | | | 710 | | | | | 715 | | | | | 720 |
| Ala | Ser | Ala | Asn | Val | Tyr | Arg | Thr | Glu | His | Asn | Lys | Ser | Asp | Ile | Ile |
| | | | | 725 | | | | | 730 | | | | | 735 | |
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| Ile | Glu | Gln | Phe | Phe | Lys | Lys | Pro | Lys | Gly | Lys | Ala | Ile | Leu | Lys | Gly |
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| Ser | Pro | Asp | Ile | Lys | Glu | Arg | Leu | Leu | Asn | Asn | Ile | Val | His | Asp | Leu |
| | | 770 | | | | 775 | | | | | 780 | | | | |
| Ser | Asn | Met | Gln | Val | Gly | Asp | Gln | Leu | Tyr | Val | Asn | Ala | His | Gly | His |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 |
| Ser | Ala | Lys | Pro | Phe | Phe | Tyr | Ser | Asp | Ser | Gly | Tyr | Ser | Lys | Ile | Ile |
| | | | | 805 | | | | | 810 | | | | | 815 | |
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| Asn | Lys | Phe | Lys | Leu | Pro | Glu | Asn | Ala | Thr | Ile | Lys | Ile | Ser | Thr | Cys |
| | | 835 | | | | | 840 | | | | | 845 | | | |
| His | Ser | Ala | Glu | Gly | Lys | Gly | Ala | His | Ile | Thr | Val | Thr | Ser | Thr | Gly |
| | | 850 | | | | 855 | | | | | 860 | | | | |
| Thr | Asn | Glu | Lys | Met | Arg | Tyr | Ser | Ser | Ile | Ile | Glu | Asn | Lys | Gly | Glu |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 |
| Phe | Ser | Arg | Ser | Leu | Ala | Gly | Thr | Met | Glu | Asn | Glu | Leu | Ile | Lys | Leu |
| | | | | 885 | | | | | 890 | | | | | 895 | |
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| | | | 900 | | | | | 905 | | | | | 910 | | |
| Thr | Phe | Tyr | Gly | Ala | Lys | Asn | Glu | Lys | Val | Ile | His | Leu | Lys | Asp | Gly |
| | | 915 | | | | | 920 | | | | | 925 | | | |
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| | | 930 | | | | 935 | | | | | 940 | | | | |
| Lys | Asn | Arg | Phe | Ser | Glu | Asn | Ile | Phe | Gly | Leu | Lys | Val | Lys | Arg | Ser |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 |
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| Pro | Ser | Gly | Ser | Ser | Trp | Arg | Val | Thr | Asp | Ser | Gly | Met | Pro | Leu | Ser |
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<212> PRT

<213> Xenorhabdus bovienii

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 Phe Leu Val Ala Pro Glu Ala Gly Asn Leu Arg Ile Val Arg His Phe
 35 40 45
 His His Val Pro His Arg Val Val Leu Ile Ala Gln Val Leu Gln His
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 Leu Arg Pro Leu Cys Met Ser Leu Trp Ala Phe Gly Phe Tyr Ala Asn
 65 70 75 80
 Lys Ala Leu Gly Leu Arg Leu Val Gly Val Gly Gly His His Ala Val
 85 90 95
 Ala Val Leu Phe Ala Gln Phe Leu Thr Arg Gly Gly Ile Arg Gln Gly
 100 105 110
 Phe His Asp Asn Leu Leu Cys Pro Ala Arg Lys Pro Gln Pro Thr Ala
 115 120 125
 Ser Gln Gln Ala Cys Tyr Val Ile Arg His Thr Leu Gln Val Thr Gly
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 Arg Ile Gly Gly Gly Gln Tyr Arg Ala Gly Gly Ile Arg Arg Ala Gln
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 Gly Gly Glu Val Phe Arg Cys Gln Pro Val Val Pro Gly Gly Phe Ile
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 Val Ser Leu Pro Val Cys Val Arg Thr Ile Arg Gln Gln Leu Ala Arg
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 Asp Gly Gln Arg Tyr Ala Val Lys Arg Asn Thr Val Arg Leu Val Gln
 195 200 205
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<212> PRT

<213> Xenorhabdus bovienii

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 Ser Pro Lys Arg Asp Ala Glu Ile Leu Leu Gly Tyr Val Thr Gly Arg
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 Ser Arg Thr Tyr Leu Ile Ala Phe Asp Glu Thr Leu Ile Ser Ser Glu

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
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| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ala | Val | Ser | Pro | Ala | Thr | Leu | Ile | Pro | Arg | Pro | Asp | Thr | Glu | Cys | Leu |
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| Asp | Leu | Gly | Thr | Gly | Thr | Gly | Ala | Ile | Ala | Leu | Ala | Leu | Ala | Ser | Glu |
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| Arg | Asn | Asp | Cys | Tyr | Val | Thr | Gly | Val | Asp | Ile | Asn | Ser | Asp | Ala | Val |
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| Asp | Pro | His | Leu | Gln | Glu | Gly | Asp | Ile | Arg | Phe | Glu | Pro | Ala | Thr | Ala |
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| Leu | Ile | Ala | Ala | Gln | Asn | Gly | Met | Ala | Asp | Leu | Gln | Ala | Ile | Val | Gly |
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| | | | 260 | | | | | 265 | | | | | 270 | | |
| Gly | Trp | Lys | Gln | Gly | Thr | Val | Val | Arg | Asn | Leu | Phe | Leu | Glu | Lys | Gly |
| | 275 | | | | | 280 | | | | | | 285 | | | |
| Tyr | Gln | Gln | Ile | Ala | Thr | Phe | Gln | Asp | Tyr | Gly | Gly | Asn | Glu | Arg | Ile |
| | 290 | | | | | 295 | | | | 300 | | | | | |
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<213> Xenorhabdus bovienii

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| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Ser | Arg | Val | Pro | Ser | Val | Thr | Thr | Arg | Cys | Ala | Thr | Ala | Met | Ile | Thr |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Leu | Ser | Ala | Ala | Ala | Val | Trp | Arg | Trp | Thr | Val | Thr | Asp | Lys | Leu | Ser |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Val | Trp | Lys | Asn | Thr | Thr | Arg | Thr | Gly | Ala | Leu | Arg | Cys | Gly | Arg | Arg |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Gly | Val | Arg | Gln | Arg | Leu | Ile | Thr | Arg | Leu | Cys | Val | Thr | Gln | Ala | Arg |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Ser | Gly | Met | Gln | Arg | Gly | Cys | Ile | Ile | Thr | Ala | Thr | Gly | Ile | Thr | Ser |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Arg | Gly | Arg | Gly | Ala | Gly | | | | | | | | | | |
| | | | 100 | | | | | | | | | | | | |

<210> 8

<211> 130

<212> PRT

<213> Xenorhabdus bovienii

<400> 8

```

Trp Gln Asn Gly Gly Ser Ser Ser Thr Thr Pro Arg Tyr Leu Ala Gly
1          5          10          15
Cys Tyr Val Trp Tyr Pro Cys Ser Ala Arg Leu Ser Gly Asn Ala Lys
20          25          30
Ser Leu Leu Ala Pro Asp Gly Glu Trp Met Lys His Thr Leu Lys Ser
35          40          45
Lys Ala Ser Gly Asn Thr Phe Thr Gly Arg Leu Ile Pro Thr Gly Arg
50          55          60
Pro Thr Val Val Thr Ile Asp Lys Ser Gly Ala Asn Thr Ala Ala Leu
65          70          75          80
Thr Leu Leu Asn Ala Glu Gly Glu Pro Gln Gln Gly Ile Glu Ile Arg
85          90          95
Gln Asn Lys Tyr Leu Asn Asn Arg Ile Glu Gln Asp His Arg His Val
100          105          110
Lys Arg Arg Ile Arg Pro Met Leu Gly Phe Lys Ser Phe Arg Arg Ala
115          120          125
Gln Thr
130

```

<210> 9

<211> 119

<212> PRT

<213> Xenorhabdus bovienii

<400> 9

```

Ala Leu Leu Phe Leu Ser Glu Ser Arg Val Met Ser Leu Ile Arg Asn
1          5          10          15
Ala Phe Lys Leu Leu His Tyr Pro Val Asp Ile Met Ala Gln Cys Val
20          25          30
Arg Trp Ser Leu Thr Tyr Ala Leu Ser Leu Arg Asn Leu Glu Glu Met
35          40          45
Met Ala Lys Arg Gly Ile Phe Val Asp His Ala Thr Ile Pro Arg Trp
50          55          60
Val Leu Arg Leu Val Pro Leu Leu Ser Lys Ala Phe Arg Lys Arg Lys
65          70          75          80
Lys Pro Val Gly Ser Arg Trp Arg Met Asp Glu Thr Tyr Ile Lys Val
85          90          95
Lys Gly Gln Trp Lys Tyr Leu Tyr Arg Ser Val Asp Thr Asp Gly Gln
100          105          110
Thr Asp Cys Gly Asp Tyr Arg
115

```

<210> 10

<211> 138

<212> PRT

<213> Xenorhabdus bovienii

<400> 10

```

Val His Ser Pro Ser Gly Ala Val Ala Pro Gly Lys Phe Phe Ile Glu
1          5          10          15
Asn Phe Ala Asp Thr Phe Pro Ala Pro Leu Pro Leu His Pro Phe Ile
20          25          30
Asp Ala Cys Ile Gln Gln Gly Phe Gln Leu Leu Pro Cys Leu Ile Ala
35          40          45
Ile Ala His Ser Gly Lys Gln Ala Phe Glu Cys Val Leu Leu Asp Arg

```


| | | | | |
|---|-----|-----|-----|-----|
| 50 | | 55 | | 60 |
| Leu Ala Leu Gln Gly Ser Gln Cys Leu Gln Ala Leu Val Leu Pro Val | | | | |
| 65 | | 70 | | 75 |
| Gly Asp Val Asn Gly Gln Thr Ala His Gly Phe Leu Leu Ile Gly Tyr | | | | 80 |
| | 85 | | 90 | |
| Thr Gln Thr His Ile Ser Thr Tyr Asn Gly Leu Trp Leu Phe Ile Thr | | | | 95 |
| | 100 | | 105 | |
| Gln Gly Val Arg Tyr Arg Phe Val Arg Gln Thr Phe Val Cys Arg Ser | | | | 110 |
| | 115 | | 120 | |
| Leu Ser Phe Ser Glu Asp Asp Cys Thr Asn | | | | 125 |
| 130 | | 135 | | |

<210> 11
 <211> 110
 <212> PRT
 <213> Xenorhabdus bovienii

| |
|---|
| <400> 11 |
| Arg Thr Cys Arg Glu Arg Pro Arg Leu Met Asp Tyr Val Leu Thr Lys |
| 1 5 10 15 |
| Ala Ala Glu Ala Asp Leu Arg Ala Ile Arg His Thr Arg Lys Gln |
| 20 25 30 |
| Trp Gly Asp Ala Gln Val Arg Arg Tyr Ile Thr Ala Leu Glu Gln Gly |
| 35 40 45 |
| Ile Ala Arg Leu Ala Val Gly Gln Gly Ser Phe Lys Asp Met Ser Ala |
| 50 55 60 |
| Leu Phe Pro Ala Leu Arg Met Ala His Cys Glu Arg His Tyr Val Phe |
| 65 70 75 80 |
| Cys Leu Pro Arg Glu Asn Ala Pro Ala Leu Ile Val Ala Ile Phe His |
| 85 90 95 |
| Glu Arg Met Asp Leu Leu Thr Arg Leu Ala Asp Arg Leu Lys |
| 100 105 110 |

<210> 12
 <211> 103
 <212> PRT
 <213> Xenorhabdus bovienii

| |
|---|
| <400> 12 |
| Pro Gln Thr Ile Ile Cys Ala Asn Val Gly Leu Cys Ile Thr Asp Lys |
| 1 5 10 15 |
| Glu Lys Thr Met Ser Arg Leu Thr Ile Asp Ile Thr Asp Arg Gln His |
| 20 25 30 |
| Gln Ser Leu Lys Ala Leu Ala Ala Leu Gln Gly Lys Thr Ile Lys Gln |
| 35 40 45 |
| Tyr Ala Leu Glu Arg Leu Phe Pro Gly Met Ser Asp Ser Asp Gln Ala |
| 50 55 60 |
| Trp Gln Glu Leu Lys Ala Leu Leu Asp Thr Arg Ile Asn Glu Gly Met |
| 65 70 75 80 |
| Glu Gly Lys Gly Cys Gly Lys Ser Ile Gly Glu Ile Leu Asp Glu Glu |
| 85 90 95 |
| Leu Ala Gly Ser Asp Arg Ala |
| 100 |

<210> 13
 <211> 265
 <212> PRT

<213> Xenorhabdus bovienii

<400> 13

```

Asn Ala His Phe Leu Ile Val Ser Lys Thr Asn Val Val Met Ser Asn
1      5      10      15
Gln Asp Pro His Asn Lys Arg Asp Ser Leu Phe Ser Ala Pro Ile Ala
20      25      30
Asn Leu Gly Asp Trp Ser Phe Asp Glu Arg Val Ala Glu Val Phe Pro
35      40      45
Asp Met Val Lys Arg Ser Ile Pro Gly Tyr Ser Asn Ile Ile Ser Met
50      55      60
Ile Gly Met Leu Ala Ser Arg Phe Val Thr Pro Gly Ser Gln Ile Tyr
65      70      75      80
Asp Leu Gly Cys Ser Leu Gly Ala Ala Thr Leu Ser Ile Arg Arg Ser
85      90      95
Ile Asn Ala Asp Asn Cys Arg Ile Ile Ala Ile Asp Asn Ser Pro Ala
100     105     110
Met Ile Glu Arg Cys Arg Arg His Ile Asp Ser Phe Lys Ala Ser Thr
115     120     125
Pro Val Glu Val Ile Glu Gln Asn Ile Leu Asp Thr Asp Ile Gln Asn
130     135     140
Ala Ser Met Val Val Leu Asn Phe Thr Leu Gln Phe Leu His Pro Asp
145     150     155     160
Asp Arg Gln Lys Ile Leu Lys Lys Ile Tyr Ala Gly Leu Lys Pro Gly
165     170     175
Gly Val Leu Val Leu Ser Glu Lys Phe Asn Phe Glu Asp Gln Lys Ile
180     185     190
Gly Glu Leu Leu Phe Asn Met His His Asp Phe Lys Arg Ala Asn Gly
195     200     205
Tyr Ser Glu Leu Glu Val Ser Gln Lys Arg Ser Met Leu Glu Asn Val
210     215     220
Met Arg Thr Asp Ser Val Asp Thr His Lys Ser Arg Leu Lys Glu Val
225     230     235     240
Gly Phe Gln His Val Glu Val Trp Phe Gln Cys Phe Asn Phe Gly Ser
245     250     255
Leu Leu Ala Ile Lys Gly Thr Glu Gln
260     265

```

<210> 14

<211> 324

<212> PRT

<213> Xenorhabdus bovienii

<400> 14

```

Thr Met Ile Asp Phe Gly Asn Phe Tyr Gln Leu Ile Ala Lys His Pro
1      5      10      15
Leu Asn His Trp Leu Asp Ser Leu Pro Ala Gln Leu Ser His Trp Gln
20      25      30
Lys Thr Ser Gln His Gly Gln Phe Ser Ser Trp Val Lys Ile Leu Glu
35      40      45
Asn Leu Pro Glu Ile Lys Pro Ser His Leu Asp Leu Lys Asn Gly Val
50      55      60
Ile Ala Ile His Glu Pro Asp Leu Ser Lys Gly Glu Lys Ala Arg Leu
65      70      75      80
His Asn Ile Leu Lys Ile Leu Met Pro Trp Arg Lys Gly Pro Phe Ser
85      90      95
Leu Tyr Asp Val Glu Ile Asp Thr Glu Trp Arg Ser Asp Trp Lys Trp

```

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | | | 100 | | | | | 105 | | | | | 110 | | | | |
| Glu | Arg | Val | Leu | Pro | His | Ile | Ser | Pro | Leu | Glu | Gly | Lys | Thr | Val | Leu | | |
| | | 115 | | | | | 120 | | | | | 125 | | | | | |
| Asp | Val | Gly | Cys | Gly | Ser | Gly | Tyr | His | Met | Trp | Arg | Met | Val | Gly | Glu | | |
| | 130 | | | | | 135 | | | | | 140 | | | | | | |
| Gly | Ala | Gln | Leu | Val | Val | Gly | Ile | Asp | Pro | Thr | Gln | Leu | Phe | Leu | Cys | | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | | |
| Gln | Phe | Glu | Ala | Ile | Arg | Lys | Leu | Leu | Gly | Asn | Asn | Gln | Arg | Ala | His | | |
| | | | 165 | | | | | | 170 | | | | | 175 | | | |
| Leu | Leu | Pro | Leu | Gly | Ile | Glu | Gln | Leu | Pro | Glu | Leu | Gln | Ala | Phe | Asp | | |
| | | 180 | | | | | | 185 | | | | | 190 | | | | |
| Thr | Val | Phe | Ser | Met | Gly | Val | Leu | Tyr | His | Arg | Arg | Ser | Pro | Leu | Asp | | |
| | 195 | | | | | | 200 | | | | | 205 | | | | | |
| His | Leu | Trp | Gln | Leu | Lys | Asn | Gln | Leu | Val | Ser | Asp | Gly | Glu | Leu | Val | | |
| | 210 | | | | 215 | | | | | | 220 | | | | | | |
| Leu | Glu | Ser | Leu | Val | Ile | Glu | Gly | Asp | Glu | Asn | Gln | Cys | Leu | Ile | Pro | | |
| 225 | | | | 230 | | | | | 235 | | | | | | 240 | | |
| Gly | Glu | Arg | Tyr | Ala | Gln | Met | Arg | Asn | Val | Tyr | Phe | Ile | Pro | Ser | Ala | | |
| | | | 245 | | | | | 250 | | | | | 255 | | | | |
| Lys | Met | Leu | Lys | Val | Trp | Leu | Glu | Lys | Cys | Gly | Phe | Val | Asp | Val | Arg | | |
| | 260 | | | | | | 265 | | | | | 270 | | | | | |
| Ile | Val | Asp | His | Ala | Ala | Thr | Thr | Pro | Asp | Glu | Gln | Arg | Arg | Thr | Glu | | |
| | 275 | | | | | 280 | | | | | 285 | | | | | | |
| Trp | Met | Lys | Thr | Glu | Ser | Leu | Val | Asp | Phe | Leu | Asp | Pro | Ser | Asp | His | | |
| | 290 | | | | 295 | | | | 300 | | | | | | | | |
| Ser | Lys | Thr | Ile | Glu | Gly | Tyr | Pro | Ala | Pro | Leu | Arg | Ala | Val | Leu | Ile | | |
| 305 | | | | 310 | | | | | 315 | | | | | | 320 | | |
| Ala | Arg | Lys | Pro | | | | | | | | | | | | | | |

<210> 15
 <211> 100
 <212> PRT
 <213> Xenorhabdus bovienii

| | | | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| <400> 15 | | | | | | | | | | | | | | | | | |
| Ser | Leu | Gln | Ile | Asp | Arg | Glu | Lys | Val | Gly | Leu | Asp | Arg | Tyr | Pro | Gln | | |
| 1 | | | 5 | | | | | 10 | | | | | 15 | | | | |
| Pro | Ile | Glu | Arg | Leu | Arg | Gln | Pro | Cys | Ala | Thr | Cys | Asp | Asn | His | Cys | | |
| | | 20 | | | | | 25 | | | | | 30 | | | | | |
| His | Ser | Arg | His | Gln | Val | Arg | Phe | Phe | Leu | Leu | Lys | Glu | Lys | Tyr | Gly | | |
| | 35 | | | | | 40 | | | | | 45 | | | | | | |
| Ala | Ala | Leu | Ala | Pro | Ile | Ser | Ser | Gln | Ser | Ala | Ile | Arg | Tyr | Gln | Phe | | |
| | 50 | | | | 55 | | | | | 60 | | | | | | | |
| Gln | Arg | His | Thr | Met | Lys | Lys | Gly | Leu | Phe | Ala | Met | Ala | Ser | Ile | Phe | | |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | | | |
| Ser | Gly | Tyr | Cys | Gly | Gly | Glu | Leu | Phe | His | Leu | Leu | Thr | Asp | Pro | Ala | | |
| | | | 85 | | | | | 90 | | | | | | 95 | | | |
| His | Glu | Ser | Gln | | | | | | | | | | | | | | |
| | | 100 | | | | | | | | | | | | | | | |

<210> 16
 <211> 267
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 16

```

Ser Ser Phe Arg Leu Asn Asp Asp Leu Leu Thr Asn Ser Tyr Ser Glu
1      5      10      15
Gly Phe Leu Met Ile Lys Leu Glu Ile Cys Cys Tyr Ser Ile Ser Cys
20      25      30
Ala Leu Val Ala Gln Asn Ala Gly Ala Asp Arg Ile Glu Leu Ser Ala
35      40      45
Ser Pro Leu Glu Gly Gly Leu Thr Pro Ser Phe Gly Ala Leu Gln Gln
50      55      60
Ser Leu Gln Arg Leu Ser Ile Pro Val His Pro Ile Val Arg Pro Arg
65      70      75      80
Gly Gly Asp Phe Cys Tyr Asn Asn Met Asp Phe Glu Ala Met Lys Asn
85      90      95
Asp Val Ala Arg Ile Arg Asp Met Gly Phe Pro Gly Ile Val Phe Gly
100      105      110
Ile Leu Ser Glu Asn Gly His Ile Asp Arg Leu Arg Met Arg Gln Leu
115      120      125
Met Ser Leu Ser Gly Asn Met Ala Val Thr Phe His Arg Ala Phe Asp
130      135      140
Met Cys Phe Asn Pro His Val Ala Leu Glu Gln Leu Thr Glu Leu Gly
145      150      155      160
Val Gln Arg Ile Leu Thr Ser Gly Gln Gln Asn Ala Glu Leu Gly
165      170      175
Leu Thr Leu Leu Lys Glu Leu Met Gln Ala Ser Arg Gly Pro Ile Ile
180      185      190
Met Pro Gly Ala Gly Val Arg Val Ser Asn Ile Ser Lys Phe Leu Glu
195      200      205
Ala Gly Met Thr Glu Val His Ser Ser Ala Gly Lys Ile Val Pro Ser
210      215      220
Thr Met Lys Tyr Arg Lys Val Gly Val Ala Met Ser Ser Asp Asp Arg
225      230      235      240
Asp Val Asp Glu Tyr Ser His Tyr Ser Val Asp Gly Glu Leu Val Glu
245      250      255
Ser Met Lys Gly Val Met Ser Leu Ile Lys Arg
260      265

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<210> 17

<211> 189

<212> PRT

<213> Xenorhabdus bovienii

<400> 17

```

Tyr Phe Gly Lys Asn Arg Arg Phe Val Ile Tyr Val Thr Leu Met Glu
1      5      10      15
Arg Asn Phe Tyr Gly Leu Phe Asn Gly Glu Glu Met Ser His Phe Ser
20      25      30
Lys Ile Ser Glu Leu Gln Asp Leu Val Ala Asp Leu Ala Gly Phe Glu
35      40      45
Gln Lys Leu Lys Gln Phe Glu Gly His Leu Gly Leu His Phe Glu Gln
50      55      60
Tyr Ser Ala Asp His Ile Ser Leu Arg Cys Asn Glu Ser Lys Ile Ala
65      70      75      80
Asp Arg Trp Arg Lys Gly Phe Leu Gln Cys Gly Gln Leu Ile Ser Glu
85      90      95
Ser Ile Ile Asn Gly Arg Pro Ile Cys Leu Phe Asp Leu Asn Gln Pro
100      105      110
Ile Val Leu Leu Asp Trp Lys Ile Asp Cys Val Glu Leu Pro Tyr Pro
115      120      125

```

Ser Gln Lys His Tyr Val His Gln Gly Trp Glu His Val Glu Leu Val
 130 135 140
 Leu Pro Val Pro Pro Glu Gln Leu Ile Cys Glu Ala Lys Lys Leu Leu
 145 150 155 160
 Pro Gln Pro Leu Pro Asp Asn Phe Arg Met Lys Glu Ser His Pro Lys
 165 170 175
 Gly Lys Asn Glu Arg Leu Pro Asn Pro Ile Leu Ala Val
 180 185

<210> 18

<211> 579

<212> PRT

<213> Xenorhabdus bovienii

<400> 18

Gly Asn Thr Val Asn Ile Gln Val Ile Leu Ser Glu Lys Ile Ser Asn
 1 5 10 15
 Ala Leu Ile Glu Ala Gly Ala Pro Thr Asp Ser Glu Ala His Val Arg
 20 25 30
 Gln Ser Ala Lys Ala Gln Phe Gly Asp Tyr Gln Ala Asn Gly Val Met
 35 40 45
 Ala Ala Ala Lys Lys Val Gly Ile Pro Pro Arg Gln Leu Ala Glu Lys
 50 55 60
 Val Val Ser Gln Leu Asp Leu Gln Gly Ile Ala Ser Lys Val Glu Ile
 65 70 75 80
 Ala Gly Pro Gly Phe Ile Asn Ile Phe Leu Asp Lys Ala Trp Val Ala
 85 90 95
 Ala Asn Ile Glu Thr Thr Leu Lys Asp Glu Lys Leu Gly Ile Thr Pro
 100 105 110
 Val Glu Pro Gln Thr Ile Val Ile Asp Tyr Ser Ala Pro Asn Val Ala
 115 120 125
 Lys Gln Met His Val Gly His Leu Arg Ser Thr Ile Ile Gly Asp Ala
 130 135 140
 Ala Ala Arg Thr Leu Glu Phe Leu Gly His Lys Val Ile Arg Ala Asn
 145 150 155 160
 His Val Gly Asp Trp Gly Thr Gln Phe Gly Met Leu Ile Ala Tyr Leu
 165 170 175
 Glu Lys Ile Gln Asn Glu Asn Ala Asn Asp Met Ala Leu Ala Asp Leu
 180 185 190
 Glu Ala Phe Tyr Arg Glu Ala Lys Lys His Tyr Asp Glu Asp Glu Glu
 195 200 205
 Phe Ala Ile Arg Ala Arg Asn Tyr Val Val Lys Leu Gln Gly Gly Asp
 210 215 220
 Glu Tyr Cys Arg Lys Met Trp Arg Lys Leu Val Asp Ile Thr Met Ser
 225 230 235 240
 Gln Asn Gln Glu Thr Tyr Asn Arg Leu Asn Val Thr Leu Thr Glu Lys
 245 250 255
 Asp Val Met Gly Glu Ser Leu Tyr Asn Asp Met Leu Pro Gly Ile Val
 260 265 270
 Ala Asp Leu Lys Gln Arg Gly Ile Ala Val Lys Ser Asp Gly Ala Thr
 275 280 285
 Val Val Tyr Leu Asp Glu Phe Lys Asn Lys Glu Gly Glu Pro Met Gly
 290 295 300
 Val Ile Ile Gln Lys Lys Asp Gly Gly Tyr Leu Tyr Thr Thr Thr Asp
 305 310 315 320
 Ile Ala Cys Ala Lys Tyr Arg His Glu Thr Leu Asn Ala Ser Arg Val
 325 330 335

Leu Tyr Tyr Ile Asp Ser Arg Gln His Gln His Leu Met Gln Ala Trp
 340 345 350
 Ala Ile Val Arg Lys Thr Gly Tyr Ile Pro Glu Ser Met Ser Leu Glu
 355 360 365
 His His Met Phe Gly Met Met Leu Gly Lys Asp Gly Lys Pro Phe Lys
 370 375 380
 Thr Arg Ala Gly Gly Thr Val Arg Leu Ser Asp Leu Leu Asp Glu Ala
 385 390 395 400
 Ile Glu Arg Ala Asp Thr Leu Ile Arg Glu Lys Asn Pro Asp Met Pro
 405 410 415
 Glu Asp Glu Leu Lys Lys Val Val Glu Ala Val Gly Ile Gly Ala Val
 420 425 430
 Lys Tyr Ala Asp Leu Ser Lys Ser Arg Thr Thr Asp Tyr Val Phe Asp
 435 440 445
 Trp Asp Asn Met Leu Ala Phe Glu Gly Asn Thr Ala Pro Tyr Met Gln
 450 455 460
 Tyr Ala Tyr Thr Arg Val Ser Ser Ile Phe Lys Arg Ala Asp Ile Asp
 465 470 475 480
 Glu Asn Ser Leu Thr Leu Pro Val Met Leu Asn Glu Glu Arg Glu Gln
 485 490 495
 Ala Leu Ala Thr Arg Leu Leu Gln Phe Glu Glu Thr Ile Thr Thr Val
 500 505 510
 Ala Arg Glu Gly Thr Pro His Val Met Cys Ala Tyr Leu Tyr Asp Leu
 515 520 525
 Ala Gly Leu Phe Ser Gly Phe Tyr Glu His Cys Pro Ile Leu Asn Ala
 530 535 540
 Asp Ser Glu Glu Leu Arg Gln Ser Arg Leu Lys Leu Ala Leu Leu Thr
 545 550 555 560
 Ala Lys Thr Leu Lys Gln Gly Leu Asp Thr Leu Gly Ile Gln Thr Val
 565 570 575
 Glu Arg Met

<210> 19
 <211> 126
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 19
 Ala Gln Val Ser Asn Met His Leu Leu Gly Asp Ile Arg Cys Gly Ile
 1 5 10 15
 Ile Asp Asn Asp Gly Leu Arg Phe His Trp Gly Asp Thr Glu Leu Phe
 20 25 30
 Ile Phe Gln Gly Ser Phe Tyr Ile Cys Cys Asn Pro Arg Phe Ile Lys
 35 40 45
 Lys Asn Ile Asp Lys Thr Trp Ala Cys Asn Phe Asn Phe Ala Gly Asn
 50 55 60
 Ser Leu Gln Ile Gln Leu Ala Asp Asp Phe Phe Cys Gln Leu Ser Arg
 65 70 75 80
 Arg Tyr Ser His Leu Phe Ser Gly Ser His His Thr Ile Arg Leu Ile
 85 90 95
 Val Thr Lys Leu Cys Phe Gly Arg Leu Thr Asp Val Ser Phe Thr Val
 100 105 110
 Gly Trp Ser Ala Ser Phe Asn Gln Arg Ile Ala Asp Phe Phe
 115 120 125

<210> 20

<211> 104
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 20
 His Ala Arg Val Gly Val Leu His Ile Arg Cys Arg Val Ala Phe Lys
 1 5 10 15
 Gly Gln His Ile Ile Pro Val Glu Asn Ile Val Cys Ser Thr Ala Leu
 20 25 30
 Gly Lys Ile Cys Ile Phe His Arg Ala Asn Pro Tyr Arg Phe His Asp
 35 40 45
 Phe Phe Gln Phe Val Phe Trp His Ile Trp Val Phe Leu Thr Asn Glu
 50 55 60
 Gly Ile Arg Thr Leu Asn Arg Phe Ile Gln Gln Ile Gly Gln Ser Tyr
 65 70 75 80
 Cys Ala Ala Gly Thr Gly Phe Glu Trp Phe Thr Ile Phe Ala Gln His
 85 90 95
 His Ala Lys His Val Val Phe Glu
 100

<210> 21
 <211> 120
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 21
 Tyr His Ala Ser Phe Gln Leu Cys Arg Arg Leu Leu His Thr Phe Tyr
 1 5 10 15
 Ser Leu Asn Thr Gln Ser Ile Lys Thr Leu Leu Gln Ser Phe Arg Cys
 20 25 30
 Gln Gln Ser Gln Leu Gln Ala Ala Leu Ala Gln Phe Phe Ala Ile Gly
 35 40 45
 Ile Gln Asp Arg Ala Val Leu Ile Glu Thr Arg Glu Gln Thr Gly Gln
 50 55 60
 Ile Val Gln Val Cys Thr His Asn Met Trp Arg Thr Phe Thr Gly Asp
 65 70 75 80
 Gly Ser Asp Arg Phe Phe Lys Leu Gln Gln Ala Gly Cys Gln Cys Leu
 85 90 95
 Leu Ala Phe Phe Ile Gln His His Arg Gln Cys Gln Ala Val Phe Ile
 100 105 110
 Asp Ile Arg Thr Phe Lys Asp Arg
 115 120

<210> 22
 <211> 334
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 22
 Phe Thr Leu Arg Glu Asp Ser Met Ser Asp Trp Thr Gly Val Ser Thr
 1 5 10 15
 Phe Asn Val Ile Leu Glu Thr Gly Leu Asp Asn Cys Asn Ile Tyr Ala
 20 25 30
 Asn Gly Leu Asn Met Ile Gly Val Ile Ile Asn Ile Thr Pro Thr Asp
 35 40 45
 Asp Glu Gly Asn Phe Val Asp Ile Asp Asp Val Thr Leu Asn Asp Asn
 50 55 60

```

Ile Lys Ile Val Asp Tyr Ile Asp Gly Ser Asp Ile Asp Gly Ser Asp
65      70      75      80
Gly Trp Phe Tyr Thr Gly Asn Pro Asn Glu Tyr Asn Thr Ile Pro Asn
      85      90      95
Ser Gln Ser Tyr Ser Leu Leu Lys Ser Glu Asn Ser Gln Ile Thr Gln
      100     105     110
Ile Lys Arg Tyr Val Ser Cys Ser Asn Thr Ser Arg Leu Arg Thr Lys
      115     120     125
Ser Phe Ser Ala Lys Val Thr Thr Thr Ser Gly Lys Val Ile Ser Ile
      130     135     140
Thr Gln Asn Ser Ile Asn Ser Ser Arg Val Val Ile Asn Ala Ile Asp
145      150     155     160
Ala Thr Asn Phe Thr Asp Asp Glu Leu Arg Thr Thr Lys Glu Thr Arg
      165     170     175
Phe Glu Asn Gln Ser Tyr Thr Ser His Lys Ser Ser Thr Asn Ser Leu
      180     185     190
Tyr Val His Thr Trp Thr Ile Pro Arg Ser Leu Lys Leu Gln Asn Trp
      195     200     205
Arg Trp Glu Asp Tyr Asn Asn Gly Trp Thr Trp Ala Gln Ser Cys Tyr
      210     215     220
Tyr Lys Thr Gly Ala Asp Gly Gly Ser Glu Ser Thr Arg Trp Leu Ala
225      230     235     240
Ala Gly Ser Ile Phe Pro Pro Gly Asn Tyr Asp Gly Leu Trp Leu Asp
      245     250     255
Asn Asp Ile Ala Leu Ser Gly Met Ala His Lys Ser Tyr Asn Val Asp
      260     265     270
Thr Gly Ile Asn Gln Leu Ser Phe Thr Arg Ile Ile Gly Lys Gly Phe
      275     280     285
Ser Trp Val Tyr Asn Ile Ser Gly Leu Asp Arg Gly His Ala Val Ile
      290     295     300
Ile Ile Asp Gln Tyr Gly Asn Lys Tyr Arg Ile Leu Phe His Ala Gly
305      310     315     320
Tyr Glu Asn Ser Asp Pro Tyr Leu Ser Ser Ser Ile Val Tyr
      325     330

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<210> 23

<211> 1673

<212> PRT

<213> Xenorhabdus bovienii

<400> 23

```

Val Tyr Ile Lys Phe Leu Lys Leu Phe Arg Arg Ile Thr Met Ser Asp
1      5      10      15
Asn Asn Glu Phe Phe Thr Gln Ala Asn Asn Phe Thr Ser Ala Val Ser
      20      25      30
Gly Gly Val Asp Pro Arg Thr Gly Leu Tyr Asn Ile Gln Ile Thr Leu
      35      40      45
Gly His Ile Val Gly Asn Gly Asn Leu Gly Pro Thr Leu Pro Leu Thr
      50      55      60
Leu Ser Tyr Ser Pro Leu Asn Lys Thr Asp Ile Gly Phe Gly Ile Gly
65      70      75      80
Phe Asn Phe Gly Leu Ser Val Tyr Asp Arg Lys Asn Ser Leu Leu Ser
      85      90      95
Leu Ser Thr Gly Glu Asn Tyr Lys Val Ile Glu Thr Asp Lys Thr Val
      100     105     110
Lys Leu Gln Gln Lys Lys Leu Asp Asn Leu Arg Phe Glu Lys Asp Leu
      115     120     125

```


Lys Glu Asn Cys Tyr Arg Ile Ile His Lys Ser Gly Asp Ile Glu Val
 130 135 140
 Leu Thr Gly Phe Asn Asn Asn Ala Phe Asp Leu Lys Val Pro Lys Lys
 145 150 155 160
 Leu Leu Asn Pro Ala Gly His Ala Ile Tyr Ile Asp Trp Asn Phe Glu
 165 170 175
 Ala Thr Gln Pro Arg Leu Asn Arg Ile Tyr Asp Asp Leu Asp Gly His
 180 185 190
 Asp Ile Pro Leu Leu Asn Leu Glu Tyr Gln Gly Leu Ile Lys Thr Ile
 195 200 205
 Leu Thr Leu Phe Pro Gly Gln Lys Glu Gly Tyr Arg Thr Glu Leu Arg
 210 215 220
 Phe Leu Asn Arg Gln Leu Asn Ser Ile His Asn Phe Ser Leu Gly Asn
 225 230 235 240
 Glu Asn Pro Leu Thr Trp Ser Phe Gly Tyr Thr Pro Ile Gly Lys Asn
 245 250 255
 Gly Ile Leu Gly Gln Trp Ile Thr Ser Met Thr Ala Pro Gly Gly Leu
 260 265 270
 Lys Glu Thr Val Asn Tyr Ser Asn Asn Asn Gln Gly His His Phe Pro
 275 280 285
 Gln Ser Ala Asn Leu Pro Val Leu Pro Tyr Val Thr Leu Met Lys Gln
 290 295 300
 Val Pro Gly Ala Gly Gln Pro Ala Ile Gln Ala Glu Tyr Ser Tyr Thr
 305 310 315 320
 Ser His Asn Tyr Val Gly Gly Gly Ser Asn Gly Ile Trp Asn Asn Lys
 325 330 335
 Leu Asp Asn Leu Tyr Gly Leu Met Thr Glu Tyr Asn Tyr Gly Ser Thr
 340 345 350
 Glu Ser Arg Arg Tyr Lys Asp Lys Glu Gly His Asp Gln Ile Val Arg
 355 360 365
 Ile Glu Arg Thr Tyr Asn Asn Tyr His Leu Leu Thr Ser Glu Cys Lys
 370 375 380
 Gln Gln Asn Gly Tyr Ile Gln Thr Thr Glu Thr Ala Tyr Tyr Ala Ile
 385 390 395 400
 Ile Gly His Asn Phe Asp Ser Gln Pro Ser Gln Phe Gln Leu Pro Lys
 405 410 415
 Thr Lys Thr Glu Thr Trp Arg Ser Ala Asp Asn Ser Tyr Arg Ser Glu
 420 425 430
 Ile Thr Glu Thr Thr Phe Asp Glu Ser Gly Asn Pro Leu Thr Lys Val
 435 440 445
 Ile Lys Asp Lys Lys Thr Gln Lys Ile Ile Ser Pro Ser Thr His Trp
 450 455 460
 Glu Tyr Tyr Pro Pro Ala Gly Glu Val Asp Asn Cys Pro Pro Glu Pro
 465 470 475 480
 Tyr Gly Phe Thr Arg Phe Val Lys Lys Ile Ile Gln Thr Pro Tyr Asp
 485 490 495
 Ser Glu Phe Lys Asp Asp Pro Glu Lys Phe Ile Gln Tyr Arg Tyr Ser
 500 505 510
 Leu Ile Gly Ser Gln Ser His Val Thr Leu Lys Ile Glu Glu Arg His
 515 520 525
 Tyr Ser Ala Thr Gln Leu Leu Asn Ser Thr Leu Phe Gln Tyr Asn Thr
 530 535 540
 Asp Lys Ser Glu Leu Gly Arg Leu Leu Lys Gln Thr Glu Cys Thr Lys
 545 550 555 560
 Gly Glu Asn Gly Lys Thr Tyr Ser Val Val His Lys Phe Thr Tyr Thr
 565 570 575
 Lys Gln Asp Asp Thr Leu Gln Gln Ser His Ser Ile Thr Thr His Asp

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | | | 580 | | | | | 585 | | | | | 590 | | | | |
| Asn | Phe | Thr | Ile | His | Arg | Ser | Gln | Val | Arg | Ser | Arg | Tyr | Thr | Gly | Arg | | |
| | | 595 | | | | | 600 | | | | | 605 | | | | | |
| Leu | Phe | Ser | Asp | Thr | Asp | Thr | Lys | Asp | Ile | Val | Thr | Gln | Met | Ser | Tyr | | |
| | 610 | | | | | 615 | | | | | 620 | | | | | | |
| Asp | Lys | Leu | Gly | Arg | Leu | Leu | Thr | Arg | Thr | Leu | Asn | Ser | Gly | Thr | Pro | | |
| 625 | | | | | 630 | | | | | 635 | | | | | 640 | | |
| Tyr | Ala | Asn | Thr | Leu | Thr | Tyr | Asp | Tyr | Glu | Leu | Asn | Asn | Leu | Gln | Asp | | |
| | | | 645 | | | | | | 650 | | | | | 655 | | | |
| Asp | Asn | Arg | Pro | Pro | Phe | Val | Ile | Thr | Thr | Thr | Asp | Val | Asn | Gly | Asn | | |
| | | | 660 | | | | | 665 | | | | | 670 | | | | |
| Gln | Leu | Arg | Asn | Glu | Phe | Asp | Gly | Ala | Gly | Arg | His | Val | Ser | Gln | Cys | | |
| | | 675 | | | | | 680 | | | | | 685 | | | | | |
| Leu | Lys | Asp | Ser | Asp | Gly | Asp | Gly | Lys | Phe | Tyr | Thr | Ile | His | Thr | Gln | | |
| | 690 | | | | | 695 | | | | | 700 | | | | | | |
| Gln | Tyr | Asp | Glu | Gln | Gly | Arg | His | His | Thr | Ser | Thr | Tyr | Ser | Asp | Tyr | | |
| 705 | | | | | 710 | | | | | 715 | | | | | 720 | | |
| Leu | Thr | Asn | Gly | Arg | Gln | Gln | Thr | Asp | Pro | Asp | Lys | Val | His | Leu | Ser | | |
| | | | 725 | | | | | | 730 | | | | | 735 | | | |
| Met | Ser | Lys | Ser | Tyr | Asp | Asn | Trp | Gly | Gln | Ile | Ala | Asn | Thr | His | Trp | | |
| | | 740 | | | | | | 745 | | | | | 750 | | | | |
| Ser | Tyr | Gly | Val | Ser | Glu | Lys | Ile | Thr | Val | Asp | Pro | Ile | Thr | Leu | Thr | | |
| | | 755 | | | | | 760 | | | | | 765 | | | | | |
| Ala | Thr | Lys | Gln | Leu | Gln | Ser | Asn | Ser | Asn | Asn | Val | Gln | Thr | Gly | Lys | | |
| | 770 | | | | | 775 | | | | | 780 | | | | | | |
| Glu | Val | Thr | Thr | Tyr | Thr | Pro | Ser | Gln | Gln | Pro | Ile | Gln | Ile | Thr | Leu | | |
| 785 | | | | | 790 | | | | | 795 | | | | | 800 | | |
| Phe | Asp | Glu | Ala | Gly | His | Leu | Gln | Ser | Cys | His | Thr | Leu | Thr | Arg | Asp | | |
| | | | 805 | | | | | | 810 | | | | | 815 | | | |
| Gly | Trp | Asp | Arg | Val | Arg | Lys | Glu | Thr | Asp | Ala | Ile | Gly | Gln | Cys | Thr | | |
| | | | 820 | | | | | 825 | | | | | 830 | | | | |
| Ile | Tyr | Gln | Tyr | Asp | Asn | Tyr | Asn | Arg | Val | Ile | Gln | Ile | Thr | Leu | Pro | | |
| | | 835 | | | | | 840 | | | | | 845 | | | | | |
| Asp | Gly | Thr | Ile | Val | Asn | Arg | Lys | Tyr | Ala | Pro | Phe | Ser | Thr | Asp | Thr | | |
| | 850 | | | | | 855 | | | | 860 | | | | | | | |
| Leu | Ile | Thr | Asp | Ile | Arg | Val | Asn | Gly | Ile | Ser | Leu | Gly | Gln | Gln | Thr | | |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 | | |
| Phe | Asp | Gly | Leu | Ser | Arg | Leu | Thr | Gln | Ser | Gln | Asp | Gly | Gly | Arg | Val | | |
| | | | 885 | | | | | | 890 | | | | | 895 | | | |
| Trp | Ala | Tyr | Thr | Tyr | Ser | Ala | Gly | Asn | Asp | Gln | Cys | Pro | Ser | Thr | Val | | |
| | | | 900 | | | | | 905 | | | | | 910 | | | | |
| Ile | Thr | Pro | Asp | Gly | Gln | Phe | Ile | His | Tyr | Gln | Tyr | Gln | Pro | Glu | Leu | | |
| | | 915 | | | | | 920 | | | | | 925 | | | | | |
| Asp | Asp | Ala | Val | Leu | Gln | Val | Ala | Ser | Asn | Glu | Ile | Thr | Gln | Gln | Phe | | |
| | 930 | | | | | 935 | | | | | 940 | | | | | | |

Thr Asp Leu Ala Thr Gly His Met Leu Thr Thr Thr Val Glu Phe Asp
 1045 1050 1055
 Gly Leu Asn Arg Glu Ile Gly Arg Lys Leu Cys Asp Ser Ser Gly His
 1060 1065 1070
 Thr Leu Asp Ile Gln Gln Ser Trp Leu Lys Thr Gln Gln Leu Ala Asn
 1075 1080 1085
 Arg Ile Val Lys Leu Asn Gly Val Leu Gln Arg Thr Glu Gln Tyr Ser
 1090 1095 1100
 Tyr Asp Ser Arg Asn Arg Leu Asn Gln Tyr Lys Cys Asp Gly Ala Glu
 1105 1110 1115 1120
 Cys Pro Thr Asp Lys Tyr Gly His Ser Ile Val Thr Gln Asn Phe Thr
 1125 1130 1135
 Tyr Asp Ile Tyr Gly Asn Ile Thr Ala Cys His Thr Thr Phe Ala Asp
 1140 1145 1150
 Gly Thr Glu Asp His Ala Thr Phe Lys Phe Ala Asn Pro Thr Asp Pro
 1155 1160 1165
 Cys Gln Leu Thr Glu Val His His Thr His Pro Asp Met Pro Asp Asn
 1170 1175 1180
 Ile Arg Leu Lys Tyr Asp Lys Ala Gly Arg Val Ile Asn Ile Thr Asp
 1185 1190 1195 1200
 Asn His Gly Asn Thr Glu Asn Phe Thr Tyr Asp Thr Leu Gly Arg Leu
 1205 1210 1215
 Gln Asn Gly Gln Gly Ser Val Tyr Gly Tyr Asp Pro Leu Asn Arg Leu
 1220 1225 1230
 Val Ser Gln Lys Thr Asp Thr Leu Asp Cys Glu Leu Tyr Tyr Arg Glu
 1235 1240 1245
 Thr Met Leu Val Asn Glu Val Arg Asn Gly Glu Met Ile Arg Leu Leu
 1250 1255 1260
 Arg Thr Gly Glu Thr Ile Ile Ala Gln Gln Arg Ala Ser Lys Val Leu
 1265 1270 1275 1280
 Leu Thr Gly Thr Asp Ser Gln Gln Ser Val Ile Leu Thr Ser Asp Lys
 1285 1290 1295
 Gln Asn Leu Ser Gln Glu Ala Tyr Ser Ala Tyr Gly Lys His Lys Ser
 1300 1305 1310
 Thr Ala Asn Asp Ala Ser Ile Leu Gly Tyr Asn Gly Glu Arg Ala Asp
 1315 1320 1325
 Pro Val Ser Gly Val Thr His Leu Gly Asn Gly Tyr Arg Ser Tyr Asp
 1330 1335 1340
 Pro Thr Leu Met Arg Phe His Thr Pro Asp Ser Leu Ser Pro Phe Gly
 1345 1350 1355 1360
 Ala Gly Gly Ile Asn Pro Tyr Ser Tyr Cys Leu Gly Asp Pro Ile Asn
 1365 1370 1375
 Arg Ser Asp Pro Ser Gly His Leu Ser Trp Gln Ala Trp Thr Gly Ile
 1380 1385 1390
 Gly Met Gly Ile Ala Gly Leu Leu Leu Thr Ile Ala Thr Gly Gly Met
 1395 1400 1405
 Ala Ile Ala Ala Ala Gly Gly Ile Ala Ala Ala Ile Ala Ser Thr Ser
 1410 1415 1420
 Thr Thr Ala Leu Ala Phe Gly Ala Leu Ser Val Thr Ser Asp Ile Thr
 1425 1430 1435 1440
 Ser Ile Val Ser Gly Ala Leu Glu Asp Ala Ser Pro Lys Ala Ser Ser
 1445 1450 1455
 Ile Leu Gly Trp Val Ser Met Gly Met Gly Ala Ala Gly Leu Ala Glu
 1460 1465 1470
 Ser Ala Ile Lys Gly Gly Thr Lys Leu Ala Thr His Leu Gly Ala Phe
 1475 1480 1485
 Ala Glu Asp Gly Glu Asn Ala Leu Leu Lys Ser Thr Ser Glu Ser Ser

1490 1495 1500
 Arg Ile Lys Trp Gly Val Thr Arg Ser Leu Asp Arg Glu Ile Val Arg
 1505 1510 1515 1520
 Asn Glu Glu Gly Gln Val Ile Lys Asp His Ser Arg Gly Tyr Thr Asp
 1525 1530 1535
 Asn Phe Met Gly Lys Gly Glu Gln Ala Ile Leu Val His Gly Asp Lys
 1540 1545 1550
 Asp Gly Phe Leu Tyr His Thr Glu Gly Asn Lys His Asn Gly Lys Gly
 1555 1560 1565
 Pro Tyr Thr Arg His Thr Pro Glu Gln Leu Val Asp Tyr Leu Lys Asp
 1570 1575 1580
 Asn Asn Ile Val Asp Leu Thr Gln Gly Gly Asp Lys Pro Val His Leu
 1585 1590 1595 1600
 Leu Ser Cys Tyr Gly Lys Ser Ser Gly Ala Ala Asp Lys Met Ala Lys
 1605 1610 1615
 Tyr Ile Asn Arg Pro Val Ile Ala Tyr Ser Asn Lys Pro Thr Ile Ser
 1620 1625 1630
 Gln Gly Leu Ala Arg Ile Glu Arg Lys Asp Phe Phe Leu Lys Ser Thr
 1635 1640 1645
 Tyr His Ser Tyr Asp Pro Arg Lys Ile Ile Leu Gly Arg Thr Glu Lys
 1650 1655 1660
 Thr Val Lys Pro Lys Thr Phe Arg Pro
 1665 1670

<210> 24
 <211> 105
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 24
 Leu Cys Tyr Gly His Ile Cys Leu Ser Gly Ile Pro His Arg His Ile
 1 5 10 15
 Tyr Ile Gly Ser Thr Tyr Tyr Gly Asn Arg Lys Ser Thr Val Leu Tyr
 20 25 30
 Ala Ala Ile Leu His Ser Val Ser Leu Phe Tyr Leu Leu Ile Ala Val
 35 40 45
 Phe Ser Ala Ser Ser Ala Gly Tyr Leu Thr Tyr Gly Leu Ser Tyr His
 50 55 60
 Thr Ile Ser Val Gln Phe Leu Gly Leu Ser His Gln Ile Pro Leu Leu
 65 70 75 80
 Leu Ser Thr Tyr Asp Gln Ser Leu Asn Leu Leu Leu Asp Tyr Gln Tyr
 85 90 95
 Gly Asp Ser Gly His Arg Asn Leu Glu
 100 105

<210> 25
 <211> 129
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 25
 Ser Ala Gln Cys Ile Val Gly Lys Val Phe Arg Ile Ser Met Val Ile
 1 5 10 15
 Ser Asp Ile Tyr Tyr Ser Thr Ser Leu Ile Ile Phe Gln Pro Asp Ile
 20 25 30
 Ile Arg His Ile Trp Met Ser Val Val Tyr Leu Cys Gln Leu Ala Trp
 35 40 45

Val Ser Trp Val Gly Lys Phe Glu Gly Ser Met Val Phe Cys Pro Ile
 50 55 60
 Cys Glu Cys Gly Val Thr Gly Gly Asp Ile Ala Ile Asp Ile Ile Ser
 65 70 75 80
 Lys Ile Leu Cys Asp Tyr Ala Met Ala Ile Phe Val Cys Arg Ala Phe
 85 90 95
 Arg Thr Val Thr Phe Ile Leu Val Gln Pro Ile Thr Gly Ile Val Arg
 100 105 110
 Val Leu Phe Cys Thr Leu Gln Tyr Ser Ile Gln Phe His Tyr Ser Ile
 115 120 125
 Cys

<210> 26
 <211> 141
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 26
 Pro Ser Ser Leu Arg Thr Ile Ser Leu Ser Lys Leu Leu Val Thr Pro
 1 5 10 15
 His Phe Ile Leu Glu Leu Ser Glu Val Asp Leu Ser Lys Ala Phe Ser
 20 25 30
 Pro Ser Ser Ala Asn Ala Pro Arg Cys Val Ala Ser Leu Val Pro Pro
 35 40 45
 Leu Met Ala Asp Ser Ala Asn Pro Ala Ala Pro Ile Pro Ile Glu Thr
 50 55 60
 His Pro Ser Ile Glu Asp Ala Phe Gly Glu Ala Ser Ser Ser Ala Pro
 65 70 75 80
 Leu Thr Ile Asp Val Ile Ser Asp Val Thr Leu Ser Ala Pro Asn Ala
 85 90 95
 Ser Ala Val Val Glu Val Glu Ala Ile Ala Ala Ala Ile Pro Pro Ala
 100 105 110
 Ala Ala Ile Ala Ile Pro Pro Val Ala Met Val Ser Ser Asn Pro Ala
 115 120 125
 Ile Pro Met Pro Ile Pro Val His Ala Cys Gln Leu Lys
 130 135 140

<210> 27
 <211> 101
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 27
 Ala His Cys His Ile Ala Leu Phe Pro Cys Trp His Asn Pro Gln Tyr
 1 5 10 15
 Cys Gln Gln His Pro Asp His His Ser Asn Cys His His Gln Phe Lys
 20 25 30
 Gln Glu Tyr Pro Pro Ser Arg Gln Arg Arg Glu Asn Ile Thr Leu Thr
 35 40 45
 Gln Leu Pro Ile Lys His Thr Gly Ile Glu Ala Gly Ser Gln Thr Asn
 50 55 60
 Arg Lys Arg Gln Thr Cys Met Phe Gln Arg Ala Asn Glu Ser Lys Val
 65 70 75 80
 His Gln Leu Gly Gln Asn Gln Gly Arg Asp Arg Asn Phe Tyr Trp Cys
 85 90 95
 Phe Asp Ile Leu Thr

100

<210> 28
 <211> 117
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 28
 Pro Gln Ser Thr Pro Ser Ser Gln Asn Ser Arg Gln Leu Thr Pro Ala
 1 5 10 15
 Glu Ser Ser Gln His Gln Lys Gln Lys Ser Asp His Ile Glu Ile Met
 20 25 30
 Ile Pro Ser Glu Ala Pro Arg Glu Tyr Arg Glu Gln Leu His Lys Ala
 35 40 45
 Thr Pro Ala Arg Asn Arg Asp Val Ala Pro Asn Pro Ser Val Phe Asp
 50 55 60
 Ile Leu Arg Asp Tyr His Trp Lys Asn Phe Ser Pro Val Lys Ala Ala
 65 70 75 80
 Lys Ser Ser Leu Thr Pro His Pro Val His Gln Lys Ala Ile Pro Leu
 85 90 95
 Asn Asp Gln Arg Asn Thr Ser Met Lys Gln Ser Leu Lys Pro Glu Met
 100 105 110
 Arg Gln Lys Leu Tyr
 115

<210> 29
 <211> 124
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 29
 Gly Lys Asn Cys Ile Asn Asp Gln Gly Asn Leu Pro Asp Arg Tyr Thr
 1 5 10 15
 Gln Asn Cys Arg Pro His Leu Thr Asp Asn Pro Pro Tyr Gly Thr Val
 20 25 30
 Thr Glu Arg Asn Pro Arg Gln Tyr Gln His Ala Asp Leu Phe Gln Met
 35 40 45
 Arg Lys Leu Ile Gly Gln Leu Gln Asn Pro Ser Gly Asn Asn Gly Pro
 50 55 60
 Thr Gln Arg Gln His Trp Arg Ile Ala Ile Arg Ser His Lys Gln Cys
 65 70 75 80
 Lys Asn Asp His Thr Asp Ile Glu Gln Cys Arg Ser Lys Ser Arg His
 85 90 95
 Arg Lys Ala Val Pro Cys Ile Lys Asn Cys Ala Ser Gln Arg Ser Gln
 100 105 110
 Arg Asn Gln Lys Asp Ile Arg Lys Arg Asn Ser Lys
 115 120

<210> 30
 <211> 515
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 30
 Asn Asn Thr Met Asn Leu Leu Lys Ser Leu Ala Ala Val Ser Ser Met
 1 5 10 15
 Thr Met Phe Ser Arg Val Leu Gly Phe Ile Arg Asp Ala Ile Ile Ala

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Arg | Ile | Phe | Gly | Ala | Gly | Met | Ala | Thr | Asp | Ala | Phe | Phe | Val | Ala | Phe |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Lys | Leu | Pro | Asn | Leu | Leu | Arg | Arg | Ile | Phe | Ala | Glu | Gly | Ala | Phe | Ser |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Gln | Ala | Phe | Val | Pro | Ile | Leu | Ala | Glu | Tyr | Lys | Asn | Gln | Gln | Gly | Asp |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Glu | Ala | Thr | Arg | Thr | Phe | Ile | Ala | Tyr | Ile | Ser | Gly | Met | Leu | Thr | Leu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Ile | Leu | Ala | Ile | Val | Ser | Val | Ile | Gly | Val | Ile | Ala | Ala | Pro | Trp | Ile |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Ile | Tyr | Val | Thr | Ala | Pro | Gly | Phe | Thr | Asp | Thr | Pro | Asp | Lys | Phe | Val |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Leu | Thr | Arg | Asp | Leu | Leu | Arg | Ile | Thr | Phe | Pro | Tyr | Ile | Phe | Leu | Ile |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ser | Leu | Ala | Ser | Leu | Ala | Gly | Ala | Ile | Leu | Asn | Thr | Trp | Asn | Arg | Phe |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Ser | Val | Pro | Ala | Phe | Ala | Pro | Thr | Leu | Leu | Asn | Val | Ser | Met | Ile | Ile |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Phe | Ala | Leu | Phe | Val | Ala | Pro | Tyr | Cys | Asn | Pro | Pro | Val | Leu | Ala | Leu |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Gly | Trp | Ala | Val | Val | Ala | Gly | Gly | Val | Leu | Gln | Leu | Ala | Tyr | Gln | Leu |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Pro | His | Leu | Lys | Lys | Ile | Gly | Met | Leu | Val | Leu | Pro | Arg | Ile | Ser | Phe |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Arg | Asp | Ser | Ala | Val | Trp | Arg | Val | Ile | Arg | Gln | Met | Gly | Pro | Ala | Ile |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Leu | Gly | Val | Ser | Val | Gly | Gln | Ile | Ser | Leu | Ile | Ile | Asn | Thr | Ile | Phe |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Ala | Ser | Phe | Leu | Val | Ser | Gly | Ser | Val | Ser | Trp | Met | Tyr | Tyr | Ala | Asp |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Arg | Leu | Met | Glu | Leu | Pro | Ser | Gly | Val | Leu | Gly | Val | Ala | Leu | Gly | Thr |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Ile | Leu | Leu | Pro | Ser | Leu | Ala | Lys | Ser | Phe | Ser | Ser | Gly | Asn | His | Glu |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Glu | Tyr | Arg | Lys | Leu | Met | Asp | Trp | Gly | Leu | Arg | Leu | Cys | Phe | Leu | Leu |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |
| Ala | Leu | Pro | Cys | Ala | Val | Ala | Leu | Gly | Ile | Leu | Ala | Glu | Pro | Leu | Thr |
| | | | | 325 | | | | | 330 | | | | | 335 | |
| Val | Ser | Leu | Phe | Gln | Tyr | Gly | His | Phe | Ser | Ala | Phe | Asp | Ala | Glu | Met |
| | | | 340 | | | | | 345 | | | | | 350 | | |
| Thr | Gln | Arg | Ala | Leu | Ile | Ala | Tyr | Cys | Phe | Gly | Leu | Met | Gly | Leu | Ile |
| | | 355 | | | | | 360 | | | | | 365 | | | |
| Val | Val | Lys | Val | Leu | Ala | Pro | Gly | Phe | Tyr | Ser | Arg | Gln | Asp | Ile | Lys |
| | 370 | | | | | | | | | | | | | | |

Leu Leu Arg Leu Met Gly Val Val Ile Ala Gly Ala Gly Ser Tyr Phe
 485 490 495
 Ala Val Leu Ala Leu Met Gly Phe Arg Leu Lys Asp Phe Ala His Arg
 500 505 510
 Gly Leu Gln
 515

<210> 31
 <211> 216
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 31
 Ala Ile Ile Leu Ile Arg Asp Lys Leu Ser Arg Ile Phe Ser Arg Gln
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 Ile Ser Gly Glu Gly Met Phe Gly Tyr Arg Ser Ala Ser Pro Lys Ile
 20 25 30
 Arg Phe Ile Thr Asp Arg Met Val Val Arg Leu Val Tyr Glu Arg Asp
 35 40 45
 Ala Tyr Arg Leu Ala Glu Tyr Tyr Ser Glu Asn Lys Asp Phe Leu Lys
 50 55 60
 Pro Trp Glu Pro Thr Arg Asp Gly Ser Phe Tyr Gln Pro Ser Gly Trp
 65 70 75 80
 Thr Asn Arg Leu Asn Tyr Ile Ala Glu Leu Gln Arg Gln Asn Ala Thr
 85 90 95
 Phe Asn Phe Val Leu Leu Asp Ser Asp Glu Arg Glu Ile Met Gly Val
 100 105 110
 Ala Asn Phe Thr Asn Val Val Arg Gly Ala Phe His Ser Cys Tyr Leu
 115 120 125
 Gly Tyr Ser Leu Ala Glu Lys Leu Gln Gly Gln Gly Leu Met Tyr Glu
 130 135 140
 Ala Leu Gln Pro Ala Ile Arg Tyr Met Gln Arg Tyr Gln Arg Met His
 145 150 155 160
 Arg Ile Met Ala Asn Tyr Met Pro His Asn His Arg Ser Gly Asn Leu
 165 170 175
 Leu Lys Lys Leu Gly Phe Glu Gln Glu Gly Tyr Ala Lys Asn Tyr Leu
 180 185 190
 Met Ile Asp Gly Val Trp Gln Asp His Val Leu Thr Ala Leu Thr Asp
 195 200 205
 Asp Ala Trp Gly Lys Val Gly Leu
 210 215

<210> 32
 <211> 404
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 32
 Trp Cys Ala Met Ser Leu Val Ser Gln Ala Arg Ser Leu Gly Lys Tyr
 1 5 10 15
 Phe Leu Leu Phe Asp Asn Leu Leu Val Val Leu Gly Phe Phe Val Val
 20 25 30
 Phe Pro Leu Ile Ser Ile Arg Phe Val Glu Gln Leu Gly Trp Ala Ala
 35 40 45
 Leu Ile Val Gly Phe Ala Leu Gly Leu Arg Gln Leu Val Gln Gln Gly
 50 55 60
 Leu Gly Ile Phe Gly Gly Ala Ile Ala Asp Arg Phe Gly Ala Lys Pro

| | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | | | | 70 | | | | | 75 | | | | 80 |
| Met | Ile | Val | Thr | Gly | Met | Leu | Leu | Arg | Ala | Leu | Gly | Phe | Ala | Leu |
| | | | | 85 | | | | | 90 | | | | | 95 |
| Ala | Met | Ala | His | Glu | Pro | Trp | Ile | Leu | Leu | Leu | Ser | Cys | Val | Leu |
| | | | | 100 | | | | 105 | | | | | 110 | |
| Gly | Leu | Gly | Gly | Thr | Leu | Phe | Asp | Pro | Pro | Arg | Ala | Ala | Leu | Val |
| | | | | 115 | | | 120 | | | | | 125 | | |
| Lys | Leu | Thr | Arg | Pro | His | Glu | Arg | Gly | Arg | Phe | Tyr | Ser | Ile | Leu |
| | | | | | | 135 | | | | | 140 | | | |
| Met | Gln | Asp | Ser | Ala | Gly | Ala | Val | Val | Gly | Ala | Leu | Ile | Gly | Ser |
| 145 | | | | | 150 | | | | | 155 | | | | 160 |
| Leu | Leu | Gln | Tyr | Asp | Phe | Asn | Ile | Val | Cys | Trp | Ile | Gly | Ala | Ser |
| | | | | 165 | | | | | 170 | | | | 175 | |
| Phe | Val | Leu | Ala | Ala | Leu | Phe | Asn | Ala | Trp | Leu | Leu | Pro | Ala | Tyr |
| | | | | 180 | | | 185 | | | | | | 190 | |
| Ile | Ser | Thr | Ile | Arg | Thr | Pro | Ile | Lys | Glu | Gly | Met | Met | Arg | Val |
| | | | | 195 | | | 200 | | | | | 205 | | |
| Arg | Asp | Arg | Arg | Phe | Leu | Tyr | Tyr | Val | Leu | Thr | Leu | Thr | Gly | Tyr |
| | 210 | | | | 215 | | | | | | 220 | | | Phe |
| Val | Leu | Ser | Val | Gln | Val | Met | Leu | Met | Phe | Pro | Ile | Ile | Ile | His |
| 225 | | | | | 230 | | | | | 235 | | | | 240 |
| Ile | Thr | Gly | Thr | Pro | Thr | Ala | Val | Lys | Trp | Met | Tyr | Ala | Ile | Glu |
| | | | | 245 | | | | | 250 | | | | | 255 |
| Ala | Ile | Ser | Leu | Thr | Leu | Leu | Tyr | Pro | Ile | Ala | Arg | Trp | Ser | Glu |
| | | | | 260 | | | | 265 | | | | 270 | | Lys |
| His | Phe | Arg | Leu | Glu | Gln | Arg | Leu | Met | Ala | Gly | Leu | Phe | Leu | Met |
| | | 275 | | | | | 280 | | | | | 285 | | Ser |
| Ile | Cys | Met | Phe | Pro | Ile | Gly | Trp | Val | Asn | Gln | Leu | His | Thr | Leu |
| | 290 | | | | | 295 | | | | | 300 | | | Phe |
| Gly | Leu | Leu | Cys | Leu | Phe | Tyr | Leu | Gly | Leu | Val | Thr | Ala | Asp | Pro |
| 305 | | | | | 310 | | | | 315 | | | | | 320 |
| Arg | Glu | Thr | Leu | Ser | Ala | Ser | Leu | Ser | Asp | Pro | Arg | Ala | Arg | Gly |
| | | | | 325 | | | | | 330 | | | | | 335 |
| Tyr | Met | Gly | Phe | Ser | Arg | Leu | Gly | Leu | Ala | Leu | Gly | Gly | Ala | Ile |
| | | | | 340 | | | | 345 | | | | | 350 | Gly |
| Tyr | Thr | Gly | Gly | Gly | Trp | Leu | Tyr | Asp | Thr | Gly | Arg | Asp | Leu | Asn |
| | | 355 | | | | | 360 | | | | | 365 | | Met |
| Pro | Gln | Leu | Pro | Trp | Ile | Leu | Leu | Gly | Leu | Ser | Gly | Leu | Ile | Thr |
| | 370 | | | | | 375 | | | | | 380 | | | Ile |
| Tyr | Ala | Leu | His | Arg | Gln | Phe | Asn | Gln | Lys | Lys | Ile | Asp | Pro | Val |
| 385 | | | | | 390 | | | | | 395 | | | | 400 |
| Leu | Gly | Arg | His | | | | | | | | | | | |

<210> 33

<211> 191

<212> PRT

<213> Xenorhabdus bovienii

<400> 33

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Gly | Ala | Asn | Met | Lys | Arg | Phe | Phe | Leu | Gly | Ala | Ala | Leu | Val | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Val | Gly | Leu | Val | Ser | Gly | Cys | Asp | Gln | Phe | Lys | Asp | Phe | Ser | Ile | Asn |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Glu | Gly | Leu | Met | Asn | Asp | Tyr | Leu | Leu | Lys | Lys | Val | His | Tyr | Gln | Lys |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Lys | Ile | Ser | Ile | Pro | Gly | Ile | Ala | Asn | Ala | Asn | Ile | Thr | Leu | Gly | Asp |

| | | | | |
|---|-----|-----|-----|-----|
| 50 | | 55 | | 60 |
| Leu Ser Ser Gln Ile Gly Arg Gln Asp Pro Glu Lys Ile Glu Leu Ser | | | | |
| 65 | | 70 | | 75 |
| Thr Gln Ala Lys Val Gln Leu Ala Thr Leu Leu Gly Thr Ile Gln Ala | | | | 80 |
| | 85 | | 90 | 95 |
| Asp Met Lys Leu Thr Ile Lys Ala Lys Pro Val Phe Asp Ala Glu Lys | | | | |
| | 100 | | 105 | 110 |
| Gly Ala Ile Phe Val Lys Gly Leu Glu Ile Val Asp Tyr Gln Thr Thr | | | | |
| | 115 | | 120 | 125 |
| Pro Glu Lys Ala Ala Ala Pro Val Lys Ala Leu Ile Pro Tyr Leu Asn | | | | |
| | 130 | | 135 | 140 |
| Thr Ser Leu Ser Glu Phe Phe Asp Thr His Pro Val Tyr Val Leu Asn | | | | |
| 145 | | 150 | | 155 |
| Pro Glu Lys Ser Lys Ala Glu Ala Ala Ala Ser Gln Phe Ala Lys Arg | | | | 160 |
| | 165 | | 170 | 175 |
| Leu Glu Ile Lys Pro Gly Lys Leu Val Ile Gly Leu Thr Asp Lys | | | | |
| | 180 | | 185 | 190 |

<210> 34

<211> 205

<212> PRT

<213> Xenorhabdus bovienii

<400> 34

| | | |
|---|-----|-----|
| Gln Val Ala Leu Gln His Gly Arg Arg Leu Gly Thr Ile Thr Leu Phe | | |
| 1 | 5 | 10 |
| Asp Asn Leu Leu Gly Leu Asn Gln Val Met Asn Glu Phe Ser Ile Val | | 15 |
| | 20 | 25 |
| Cys Arg Ile Leu Gly Thr Leu Phe Asn Arg Ala Pro Gln Asp Pro Val | | 30 |
| | 35 | 40 |
| Leu Gln Pro Leu Ile Thr Met Ile Ala Glu Gly Lys Leu Lys Gln Ala | | 45 |
| | 50 | 55 |
| Trp Pro Leu Glu Gln Asp Glu Trp Leu Asp Arg Leu Gln Gln Asn Ser | | 60 |
| 65 | 70 | 75 |
| Glu Leu Ser Val Met Ala Ala Asp Tyr His Ala Leu Phe Thr Gly Glu | | 80 |
| | 85 | 90 |
| Ser Ala Ser Val Ala Val Cys Arg Ser Asp Tyr Thr Asp Gly Glu Glu | | 95 |
| | 100 | 105 |
| Ser Glu Val Arg Gln Phe Leu Thr Glu Arg Gly Met Pro Leu Ser Asp | | 110 |
| | 115 | 120 |
| Thr Pro Ala Asp Gln Phe Gly Ser Leu Leu Leu Ala Val Ser Trp Leu | | 125 |
| | 130 | 135 |
| Glu Asp Gln Ala Ala Glu Asp Glu Ile Gln Ala Gln Ile Thr Leu Phe | | 140 |
| 145 | 150 | 155 |
| Asp Glu Tyr Leu Leu Pro Trp Cys Gly Gln Phe Leu Gly Lys Val Glu | | 160 |
| | 165 | 170 |
| Ala His Ala Thr Ser Gly Phe Tyr Arg Thr Leu Ala Ile Val Thr Arg | | 175 |
| | 180 | 185 |
| Glu Ala Leu Gln Ala Leu Arg Asp Glu Leu Glu Ser Glu | | 190 |
| | 195 | 200 |
| | | 205 |

<210> 35

<211> 315

<212> PRT

<213> Xenorhabdus bovienii

<400> 35

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Asp Cys Met Asn Ile Ile Phe Phe His Pro Ser Phe Asn Thr Asp Glu
1      5      10      15
Trp Ile Gln Gly Ile Gln Ala Arg Leu Pro Asp Ala Lys Val Arg Gln
20      25      30
Trp Val Ser Gly Asp Gln Glu Pro Ala Asp Tyr Ala Leu Val Trp Gln
35      40      45
Pro Pro Tyr Glu Met Leu Ala Asn Arg Gln Gly Leu Lys Gly Ile Phe
50      55      60
Ala Leu Gly Ala Gly Val Asp Ala Ile Phe Lys Gln Glu Ser Lys Asn
65      70      75      80
Pro Gly Thr Leu Leu Ala Asp Val Pro Leu Ile Arg Leu Glu Asp Thr
85      90      95
Gly Met Gly Arg Gln Met Gln Glu Tyr Ala Ile Thr Ser Val Leu His
100     105     110
Tyr Phe Arg Arg Met Asp Glu Tyr Lys Arg Tyr Gln Glu Gln Arg Leu
115     120     125
Trp Asn Pro Ile Ala Pro His Asn Arg Lys Glu Phe Val Ile Gly Val
130     135     140
Leu Gly Ala Gly Ile Leu Gly Arg Ser Val Ile Gly Lys Leu Met Glu
145     150     155     160
Phe Asp Phe Asn Val Arg Cys Trp Ser Arg Thr Ser Lys Gln Leu Asp
165     170     175
Ser Val Glu Ser Phe Tyr Gly Lys Glu Gln Leu Gly Asp Phe Leu Ser
180     185     190
Gly Cys Lys Val Leu Ile Asn Leu Leu Pro Asp Thr Pro Asp Thr Arg
195     200     205
Gly Ile Leu Asn Leu Ser Leu Phe Ser Gln Leu Lys Ser Gly Ser Tyr
210     215     220
Val Ile Asn Leu Ala Arg Gly Ala Gln Leu Val Glu Gln Asp Leu Leu
225     230     235     240
Val Ala Ile Asp Lys Gly Tyr Ile Ala Gly Ala Thr Leu Asp Val Phe
245     250     255
Ala Glu Glu Pro Leu Ser Asn Met His Pro Phe Trp Thr His Pro Arg
260     265     270
Ile Asn Val Thr Pro His Ile Ala Ala Asn Thr Ile Pro Glu Ala Ala
275     280     285
Met Asp Val Ile Cys Glu Asn Ile Arg Arg Met Val Gln Gly Glu Met
290     295     300
Pro Thr Gly Leu Val Asp Arg Val Arg Gly Tyr
305     310     315

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<210> 36

<211> 132

<212> PRT

<213> *Xenorhabdus bovienii*

<400> 36

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Lys Thr Ser Gln Gly Phe Thr Ser Thr Thr Cys Ser Asn Gly Asn Val
1      5      10      15
Leu Lys Ile Cys Gly Leu Ile Thr Pro Cys Ser Ser Leu Ile Gln Arg
20      25      30
Thr Tyr Pro Asn Asn Met Thr Ile Gly Ile Phe Ser Lys Glu Ser Thr
35      40      45
Ala Lys Asn Phe Gly Met Gly Phe Leu Tyr Tyr Phe Asp Leu Arg Val
50      55      60
Leu Ser Pro Phe Phe Lys Ala Pro Ile Asn Ile Phe Thr Gly Trp Gln
65      70      75      80

```

His Asn Thr Asn Phe Arg Lys Ser Arg Asn Ser Thr Ile Arg Leu Cys
 85 90 95
 Ser Ser Thr Pro Asn Ser Lys Gln Tyr Phe Thr Thr Ser Arg Lys Cys
 100 105 110
 His Ile Thr Gly Ala Gly Lys Tyr Arg Phe Ser Ile Glu Asn Cys Phe
 115 120 125
 Ile Lys Ser Gly
 130

<210> 37
 <211> 289
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 37
 Tyr Ser Ala Gly Cys Ser Thr Val Leu Lys Ser Ser Leu Asn Leu Gln
 1 5 10 15
 Cys Asp Thr Phe Asn Cys Glu Ser Phe Val Met Leu Thr Leu Asn Phe
 20 25 30
 Ser Thr Ser Val Asn Ala Lys Pro Ser His Ile Trp Ala His Tyr Val
 35 40 45
 Asp Phe Asp Leu Arg Lys Lys Trp Glu Val Asp Leu Glu Tyr Phe Gln
 50 55 60
 Phe Glu Gly Glu Val Lys Thr Gly Gln Tyr Gly Arg Met Ile Leu Ser
 65 70 75 80
 Gly Met Pro Glu Ile Arg Phe Tyr Leu Ser Asn Ile Glu Val Asn Lys
 85 90 95
 Glu Phe Thr Asp Gln Val Asn Leu Pro Gln Met Gly Ile Leu Thr Phe
 100 105 110
 Arg His Gln Ile Ile Thr Asp Glu Asn Asn Met Ala Cys Arg Val Gln
 115 120 125
 Val Thr Val Ser Phe Glu Pro Asp Ala Asn Ile Pro Ala Val Gln Ala
 130 135 140
 Glu Ser Phe Phe Lys Gln Gly Thr Gln Asp Leu Val Glu Ser Val Leu
 145 150 155 160
 Arg Leu Lys Ser Val Val Glu Thr Val Ser Pro Lys Pro Asn Leu Gln
 165 170 175
 Leu Val Tyr Val Ser Asp Ile Glu Ser Ser Thr Ala Phe Tyr Lys Thr
 180 185 190
 Ile Phe Asn Ala Glu Pro Ile Phe Ala Ser Ser Arg Tyr Val Ala Phe
 195 200 205
 Pro Ala Gly Gly Glu Val Leu Phe Ala Ile Trp Ser Gly Gly Ala Lys
 210 215 220
 Pro Asp Arg Ala Ile Pro Arg Phe Ser Glu Ile Gly Ile Met Leu Pro
 225 230 235 240
 Ser Gly Lys Asp Val Asp Arg Cys Phe Glu Glu Trp Arg Lys Asn Pro
 245 250 255
 Glu Ile Lys Ile Val Gln Glu Pro His Thr Glu Val Phe Gly Arg Thr
 260 265 270
 Phe Leu Ala Glu Asp Pro Asp Gly His Ile Ile Arg Val Cys Pro Leu
 275 280 285
 Asp

<210> 38
 <211> 270
 <212> PRT

<213> Xenorhabdus bovienii

<400> 38

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Lys | Gly | Asn | Gln | Ile | Thr | Met | Ile | Leu | Tyr | Lys | Gly | Ser | Lys | Asn | Tyr |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Leu | Phe | Asn | Gln | Leu | Asn | Tyr | Asp | Ser | Cys | Val | Leu | Leu | Glu | Val | Asp |
| | | 20 | | | | | | 25 | | | | | 30 | | |
| Glu | Ser | Val | Asn | Leu | Asn | Gly | Trp | Asp | Glu | Leu | Ser | Arg | Ala | Gln | Arg |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Leu | Leu | Phe | Leu | Met | Glu | Ile | Leu | Arg | Arg | Tyr | His | Phe | Pro | Val | Gln |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Gly | Lys | Val | Leu | Ala | Gln | Lys | Leu | Asn | Ile | Ser | Leu | Arg | Thr | Leu | Tyr |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Arg | Asp | Ile | Ala | Ser | Leu | Gln | Ala | Gln | Gly | Ala | Ile | Ile | Glu | Gly | Glu |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Pro | Gly | Ile | Gly | Tyr | Val | Leu | Arg | Pro | Gly | Phe | Val | Leu | Pro | Pro | Leu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Met | Phe | Thr | Gln | Asn | Glu | Ile | Glu | Ala | Leu | Ala | Leu | Gly | Ala | Asn | Trp |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Val | Ala | Lys | Arg | Ala | Asp | Pro | Gln | Leu | Lys | Glu | Ser | Ala | Asn | Asn | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Ile | Ser | Lys | Ile | Ala | Ala | Val | Ile | Pro | Ala | Glu | Leu | Lys | Gln | Met | Leu |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Glu | Ala | Ser | Ser | Leu | Leu | Ile | Gly | Pro | Ala | Ala | Thr | Ala | Val | Gln | Pro |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Val | Val | Glu | Ile | Gln | Gln | Ile | Arg | Gln | Ala | Ile | Asn | Thr | Arg | His | Lys |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ile | Thr | Leu | Ala | Tyr | Leu | Asp | Ile | Lys | Asp | Ile | Pro | Ser | Glu | Arg | Thr |
| | | 195 | | | | 200 | | | | | | 205 | | | |
| Ile | Trp | Pro | Phe | Ala | Leu | Gly | Tyr | Phe | Glu | Asn | Ile | Ser | Ile | Val | Ile |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Gly | Trp | Cys | Glu | Leu | Arg | Glu | Glu | Phe | Arg | His | Phe | Arg | Ser | Asp | Arg |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| Ile | Met | Arg | Leu | Lys | Ile | Glu | Asn | Gln | Cys | Tyr | Pro | Arg | Ser | Arg | Gln |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Val | Leu | Leu | Lys | Glu | Trp | Arg | Ala | Met | Glu | Lys | Ile | Ser | Arg | | |
| | | | 260 | | | | | 265 | | | | | 270 | | |

<210> 39

<211> 209

<212> PRT

<213> Xenorhabdus bovienii

<400> 39

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Arg | Lys | Met | Thr | Ile | Tyr | Asp | Leu | Lys | Pro | Arg | Phe | Gln | Asn | Leu | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Arg | Pro | Ile | Val | Ile | Tyr | Leu | Tyr | Lys | Gln | Gly | Ile | Thr | Ala | Asn | Gln |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Val | Thr | Leu | Thr | Ala | Leu | Phe | Leu | Ser | Ile | Phe | Ala | Gly | Ser | Leu | Leu |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ser | Leu | Phe | Pro | Ser | Pro | His | Leu | Tyr | Trp | Leu | Leu | Pro | Val | Phe | Leu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Phe | Ile | Arg | Met | Ala | Leu | Asn | Ala | Ile | Asp | Gly | Met | Leu | Ala | Arg | Glu |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| His | Asn | Gln | Lys | Ser | His | Leu | Gly | Ala | Ile | Tyr | Asn | Glu | Leu | Gly | Asp |
| | | | 85 | | | | | | 90 | | | | | 95 | |
| Val | Ile | Ser | Asp | Val | Ala | Leu | Tyr | Leu | Pro | Phe | Cys | Leu | Leu | Pro | Asp |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| | | | 100 | | | | | 105 | | | | | 110 | | | |
| Val | Asn | Ser | Leu | Ser | Leu | Leu | Ile | Ile | Leu | Phe | Leu | Thr | Ile | Leu | Thr | |
| | | 115 | | | | | | 120 | | | | | 125 | | | |
| Glu | Phe | Ile | Gly | Val | Leu | Ala | Gln | Thr | Ile | Gly | Ala | Ser | Arg | Arg | Tyr | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Asp | Gly | Pro | Ile | Gly | Lys | Ser | Asp | Arg | Ala | Phe | Ile | Phe | Gly | Ala | Tyr | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Gly | Leu | Ile | Ile | Ala | Ile | Phe | Pro | Leu | Ala | Leu | Gly | Trp | Ser | Ile | Ser | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Leu | Phe | Ala | Phe | Met | Ile | Ile | Leu | Leu | Leu | Val | Thr | Cys | Tyr | Gln | Arg | |
| | | 180 | | | | | | 185 | | | | | 190 | | | |
| Val | Val | Lys | Ala | Leu | Arg | Glu | Ile | Arg | Leu | Ala | Glu | Gln | Ser | His | Ser | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Lys | | | | | | | | | | | | | | | | |

<210> 40

<211> 592

<212> PRT

<213> Xenorhabdus bovienii

<400> 40

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Gly | Val | Asn | Met | Thr | Pro | Gln | Leu | Asp | Gln | Arg | Ile | Ala | Glu | Glu | His | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | |
| Tyr | Phe | Thr | Thr | Ser | Asp | Asn | Ala | Ser | Leu | Phe | Tyr | Arg | Tyr | Trp | Pro | |
| | | | 20 | | | | | 25 | | | | | 30 | | | |
| Gln | Gln | Gln | Ala | Asn | Pro | Asp | Arg | Ala | Ile | Ile | Ile | Phe | His | Arg | Gly | |
| | | 35 | | | | 40 | | | | | | 45 | | | | |
| His | Glu | His | Ser | Gly | Arg | Ile | Gln | His | Val | Val | Asp | Gly | Leu | Asp | Leu | |
| | 50 | | | | 55 | | | | | | 60 | | | | | |
| Pro | Asp | Val | Pro | Met | Phe | Ala | Trp | Asp | Ala | Arg | Gly | His | Gly | Lys | Thr | |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | | |
| Glu | Gly | Pro | Arg | Gly | Tyr | Ser | Pro | Ser | Met | Gly | Thr | Ser | Ile | Arg | Asp | |
| | | | 85 | | | | | 90 | | | | | 95 | | | |
| Val | Asp | Glu | Phe | Val | Arg | Phe | Ile | Ala | Thr | Gln | Tyr | Gly | Ile | Ala | Met | |
| | | 100 | | | | | | 105 | | | | | 110 | | | |
| Glu | Asn | Ile | Val | Val | Ile | Gly | Gln | Ser | Val | Gly | Ala | Val | Leu | Val | Ser | |
| | 115 | | | | | 120 | | | | | | 125 | | | | |
| Ala | Trp | Val | His | Asp | Tyr | Ala | Pro | Lys | Ile | Arg | Ala | Met | Ile | Leu | Ala | |
| | 130 | | | | | 135 | | | | | 140 | | | | | |
| Ala | Pro | Ala | Phe | Asp | Ile | Lys | Leu | Tyr | Ile | Pro | Phe | Ala | Thr | Gln | Gly | |
| 145 | | | | 150 | | | | | | 155 | | | | | 160 | |
| Leu | Gln | Leu | Met | Gln | Lys | Ala | Arg | Gly | Ile | Phe | Phe | Val | Asn | Ser | Tyr | |
| | | | 165 | | | | | 170 | | | | | 175 | | | |
| Val | Lys | Ala | Arg | Tyr | Leu | Thr | His | Asp | Glu | Thr | Arg | Ile | Ala | Ser | Tyr | |
| | | 180 | | | | | | 185 | | | | | 190 | | | |
| Asn | Ser | Asp | Pro | Leu | Ile | Thr | Arg | Glu | Ile | Ala | Val | Asn | Ile | Leu | Leu | |
| | 195 | | | | | 200 | | | | | | 205 | | | | |
| Asp | Leu | Tyr | Gln | Thr | Ala | Glu | Arg | Val | Val | Lys | Asp | Ala | Ala | Ala | Ile | |
| | 210 | | | | | 215 | | | | | 220 | | | | | |
| Thr | Leu | Pro | Thr | Leu | Leu | Phe | Ile | Ser | Gly | Ser | Asp | Tyr | Val | Val | Asn | |
| 225 | | | | 230 | | | | | | 235 | | | | | 240 | |
| Lys | Lys | Pro | Gln | His | Gln | Phe | Tyr | Gln | Gln | Leu | Asn | Thr | Pro | Ile | Lys | |
| | | | 245 | | | | | 250 | | | | | | 255 | | |
| Glu | Lys | His | Val | Met | Asp | Gly | Phe | Tyr | His | Asp | Thr | Leu | Gly | Glu | Lys | |
| | | 260 | | | | | | 265 | | | | | 270 | | | |
| Asp | Arg | His | Leu | Val | Phe | Asp | Lys | Ile | Arg | Val | Phe | Ile | Glu | Arg | Ile | |

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<210> 41
<211> 121
<212> PRT
<213> Xenorhabdus bovienii
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| <400> 41 | | | | | | | | | | | | | | | |
| His | His | Asn | Ser | Ile | Asn | Val | Leu | Leu | Lys | Asn | Ile | Ile | Ser | Pro | His |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Gln | Ile | Met | Leu | Leu | Cys | Phe | Thr | Val | Thr | Gly | His | Asn | Asn | Arg | Pro |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ile | Gln | Thr | Glu | Arg | Ser | Leu | Phe | Phe | Thr | Val | Val | Met | Ser | Thr | Gln |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asp | Val | Ser | Ser | Met | Ser | Leu | Thr | Asp | Ser | Ile | Cys | Leu | Met | Phe | Leu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Cys | Ser | Arg | Gly | Met | Pro | Val | Asp | Thr | Val | Arg | Gln | Lys | Gly | Arg | Ala |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |
| Val | Thr | Ala | His | Pro | Trp | Glu | Arg | Arg | Phe | Val | Met | Leu | Met | Asn | Leu |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| | | | | 85 | | | | | 90 | | | | | 95 | | | |
| Ser | Asp | Leu | Leu | Pro | Leu | Ser | Thr | Ala | Ser | Pro | Trp | Lys | Ile | Ser | Trp | | |
| | | 100 | | | | | | 105 | | | | | 110 | | | | |
| Leu | Ser | Ala | Arg | Val | Ser | Glu | Arg | Tyr | | | | | | | | | |
| | | 115 | | | | | 120 | | | | | | | | | | |

<210> 42

<211> 444

<212> PRT

<213> Xenorhabdus bovienii

<400> 42

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|
| Ile | Asn | Lys | Tyr | Lys | Met | Glu | His | His | Met | His | Ser | Ser | Leu | Asp | Ser | | |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | | | |
| Arg | Arg | Arg | Leu | Trp | Leu | Thr | Gly | Val | Ile | Trp | Leu | Leu | Phe | Leu | Ala | | |
| | | 20 | | | | | 25 | | | | | | 30 | | | | |
| Pro | Phe | Phe | Phe | Leu | Thr | Tyr | Gly | Gln | Val | Asn | Gln | Phe | Thr | Ala | Gln | | |
| | | 35 | | | | 40 | | | | | 45 | | | | | | |
| Arg | Ser | Asp | Val | Gly | Thr | Val | Met | Phe | Gly | Trp | Glu | His | Asn | Ile | Pro | | |
| | 50 | | | | 55 | | | | | 60 | | | | | | | |
| Phe | Trp | Ser | Trp | Ser | Ile | Pro | Tyr | Trp | Ser | Ile | Asp | Leu | Phe | Tyr | | | |
| 65 | | | | 70 | | | | | 75 | | | | | 80 | | | |
| Gly | Ile | Ser | Leu | Phe | Ile | Cys | Thr | His | Arg | Arg | Glu | Gln | Trp | Leu | His | | |
| | | | 85 | | | | | 90 | | | | | 95 | | | | |
| Gly | Trp | Arg | Leu | Met | Thr | Ala | Ser | Leu | Ile | Ala | Cys | Val | Gly | Phe | Leu | | |
| | | 100 | | | | | 105 | | | | | | 110 | | | | |
| Leu | Phe | Pro | Leu | Lys | Phe | Ser | Phe | Ser | Arg | Pro | Thr | Thr | Glu | Gly | Leu | | |
| | 115 | | | | | 120 | | | | | 125 | | | | | | |
| Phe | Gly | Trp | Leu | Phe | Asn | Gln | Leu | Glu | Leu | Phe | Asp | Leu | Pro | Tyr | Asn | | |
| | 130 | | | | 135 | | | | | 140 | | | | | | | |
| Gln | Ala | Pro | Ser | Leu | His | Ile | Ile | Leu | Leu | Trp | Leu | Leu | Trp | Leu | Arg | | |
| 145 | | | 150 | | | | | | 155 | | | | | | 160 | | |
| Tyr | Ser | Ala | Tyr | Val | Ser | Gly | Tyr | Trp | Arg | Gly | Leu | Leu | His | Ile | Trp | | |
| | | 165 | | | | | 170 | | | | | | 175 | | | | |
| Ser | Val | Leu | Ile | Ala | Leu | Ser | Val | Leu | Thr | Thr | Trp | Gln | His | His | Phe | | |
| | 180 | | | | | | 185 | | | | | 190 | | | | | |
| Ile | Asp | Val | Leu | Thr | Gly | Phe | Ala | Val | Gly | Val | Ile | Leu | Ser | Tyr | Leu | | |
| | 195 | | | | 200 | | | | | | 205 | | | | | | |
| Leu | Pro | Val | Ser | Tyr | Arg | Trp | Arg | Trp | Gln | Pro | Asn | Gln | Asp | Arg | Tyr | | |
| | 210 | | | | 215 | | | | 220 | | | | | | | | |
| Ala | Arg | Lys | Leu | Phe | Gly | Tyr | Tyr | Leu | Thr | Gly | Ser | Ala | Leu | Phe | Ala | | |
| 225 | | | 230 | | | | | | 235 | | | | | 240 | | | |
| Leu | Ile | Ala | Ser | Leu | Leu | Gly | Gly | Ser | Phe | Trp | Ile | Leu | Leu | Trp | Pro | | |
| | | 245 | | | | | 250 | | | | | | 255 | | | | |
| Ala | Val | Ser | Leu | Leu | Met | Ile | Ala | Leu | Gly | Tyr | Ala | Gly | Leu | Gly | Ser | | |
| | | 260 | | | | 265 | | | | | | 270 | | | | | |
| Ser | Val | Phe | Gln | Lys | Gln | Pro | Asp | Gly | Arg | Met | Ser | Leu | Ser | Ala | Arg | | |
| | 275 | | | | 280 | | | | | | 285 | | | | | | |
| Trp | Leu | Leu | Ala | Pro | Tyr | Gln | Leu | Gly | Ala | Trp | Leu | Ser | Tyr | Leu | Trp | | |
| | 290 | | | | 295 | | | | 300 | | | | | | | | |
| Phe | Arg | Arg | Lys | Ser | Ala | Pro | Phe | Asn | His | Ile | Thr | Glu | Gly | Ile | Ile | | |
| 305 | | | 310 | | | | | | 315 | | | | | 320 | | | |
| Leu | Gly | Ser | Leu | Pro | Cys | Gln | Pro | Val | Thr | Ala | Val | Ser | Val | Leu | Asp | | |
| | | 325 | | | | | 330 | | | | | | 335 | | | | |
| Ile | Thr | Ala | Glu | Trp | His | Arg | Arg | Ser | Asp | Ala | Arg | Thr | Val | Asn | Tyr | | |
| | 340 | | | | | 345 | | | | | | 350 | | | | | |
| Val | Cys | Gln | Pro | Gln | Ile | Asp | Leu | Leu | Pro | Leu | Ala | Pro | Glu | Ala | Leu | | |

| | | | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|
| | | 355 | | | | | 360 | | | | | 365 | | | | | | | |
| Gln | Ser | Ala | Val | Cys | Thr | Leu | Asp | Lys | Leu | Arg | Gln | Gln | Gly | Asp | Val | | | | |
| | | 370 | | | | | 375 | | | | | 380 | | | | | | | |
| Phe | Val | His | Cys | Thr | Leu | Gly | Leu | Ser | Arg | Ser | Ala | Met | Val | Val | Ala | | | | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | | | | |
| Ala | Trp | Leu | Leu | Lys | Gln | His | Pro | Glu | Tyr | Asp | Ile | Asn | Thr | Val | Val | | | | |
| | | | | 405 | | | | | 410 | | | | | 415 | | | | | |
| Ala | Ile | Leu | Arg | Lys | Ala | Arg | Pro | His | Val | Thr | Phe | Arg | Gln | Thr | His | | | | |
| | | | 420 | | | | | 425 | | | | | 430 | | | | | | |
| Leu | Asp | Ala | Leu | Ser | Gln | Trp | Ala | Lys | Gly | Tyr | Leu | | | | | | | | |
| | | 435 | | | | | 440 | | | | | | | | | | | | |

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<210> 43
<211> 174
<212> PRT
<213> Xenorhabdus bovienii
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| | | | | | | | | | | | | | | | |
|------------|------------|-----------|------------|------------|-----------|------------|------------|------------|------------|-----|------------|------------|-----------|------------|-----|
| <400> 43 | | | | | | | | | | | | | | | |
| Gln 1 | Ser | Cys | Val | Lys 5 | Pro | Asp | Arg | Met | Ser 10 | Arg | Ser | Asp | Lys 15 | His | Ile |
| Trp | Met | Pro | Cys 20 | Leu | Asn | Gly | Gln | Lys 25 | Ala | Thr | Tyr | Asn 30 | Gly | Glu | His |
| Asn | Met | Gln 35 | Pro | Glu | Asn | Leu | Ile 40 | Ser | Lys | Val | Ile | Ile 45 | Ala | Thr | Leu |
| Lys | Ser 50 | Trp | Arg | Phe | Ile 55 | Ser | Thr | Leu | Ser | Ala | Phe 60 | Ser | Ile | Leu | Ile |
| Ala 65 | Thr | Ala | Met | Leu 70 | Ile | Ala | Val | Phe | Asn 75 | Thr | Thr | Ala | Leu | Asn | Asn |
| Ile | Ala | Leu | Tyr 85 | Ala | Val | Leu | Leu | Phe 90 | Thr | Thr | Leu | Tyr | Cys 95 | Gln | Tyr |
| Tyr | Cys | Trp | Arg 100 | Thr | Trp | Leu | Asp | Cys 105 | His | Tyr | Phe | Gln 110 | Ile | Leu | Asn |
| Ser | Ser 115 | Pro | Glu | Lys | Ser | Ala | Glu 120 | Phe | Asp | Gln | Thr | Leu 125 | Leu | Leu | Ile |
| Phe | Asn 130 | Lys | Leu | Pro | Gln | Ser 135 | Arg | Thr | Gln | Asn | Asp 140 | Arg | Phe | Asn | Gly |
| Ala 145 | Ile | Lys | Leu | Leu 150 | Lys | Ala | Thr | Ile | Gly 155 | Leu | Ile | Leu | Gln | Trp 160 | |
| Ile | Leu | Phe | Phe 165 | Leu | Phe | Leu | Leu | Thr 170 | Leu | Lys | Tyr | Ser | Ala | | |

```
<210> 44
<211> 466
<212> PRT
<213> Xenorhabdus bovienii
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| | | | | | | | | | | | | | | | |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| <400> 44 | | | | | | | | | | | | | | | |
| Met | Asn | Thr | Arg | Lys | Ile | Asn | Gly | Ile | Arg | Pro | Phe | Ser | Ala | Phe | Ile |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Asp | Ser | Cys | Leu | Lys | Glu | Ser | Tyr | Ser | Phe | Pro | Arg | Phe | Ile | Arg | Asp |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ile | Ile | Ala | Gly | Ile | Thr | Val | Gly | Val | Ile | Ala | Ile | Pro | Leu | Ala | Met |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ala | Leu | Ala | Ile | Gly | Ser | Gly | Val | Ala | Pro | Gln | Tyr | Gly | Leu | Tyr | Thr |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Ala | Ala | Ile | Ala | Gly | Ile | Val | Ile | Ala | Met | Thr | Gly | Gly | Ser | Arg | Tyr |
| 65 | | | | | 70 | | | | | 75 | | | | | 80 |

Ser Val Ser Gly Pro Thr Ala Ala Phe Val Val Ile Leu Tyr Pro Val
 85 90 95
 Ser Gln Gln Phe Gly Leu Ser Gly Leu Leu Ile Ala Thr Leu Met Ser
 100 105 110
 Gly Val Ile Leu Ile Val Met Gly Leu Ala Arg Phe Gly Arg Leu Ile
 115 120 125
 Glu Tyr Ile Pro Met Ser Val Thr Leu Gly Phe Thr Ser Gly Ile Ala
 130 135 140
 Ile Thr Ile Ala Thr Met Gln Val Gln Asn Phe Phe Gly Leu Lys Leu
 145 150 155 160
 Ala His Ile Pro Glu Asn Tyr Ile Asp Lys Val Val Ala Leu Tyr Gln
 165 170 175
 Ala Leu Pro Ser Leu Gln Leu Ser Asp Thr Leu Ile Gly Leu Thr Thr
 180 185 190
 Leu Leu Val Leu Ile Phe Trp Pro Lys Leu Gly Val Lys Leu Pro Gly
 195 200 205
 His Leu Pro Ala Leu Ile Ala Gly Thr Ala Val Met Gly Ala Met His
 210 215 220
 Leu Leu Asn His Asp Val Ala Thr Ile Gly Ser Ser Phe Ser Tyr Thr
 225 230 235 240
 Leu Ala Asp Gly Thr Gln Gly Gln Gly Ile Pro Pro Ile Leu Pro Gln
 245 250 255
 Phe Val Leu Pro Trp Asn Leu Pro Asp Thr His Ser Leu Asp Ile Ser
 260 265 270
 Trp Asn Thr Val Ser Ala Leu Leu Pro Ala Ala Phe Ser Met Ala Met
 275 280 285
 Leu Gly Ala Ile Glu Ser Leu Leu Cys Ala Val Ile Leu Asp Gly Met
 290 295 300
 Thr Gly Lys Lys His His Ser Asn Gly Glu Leu Leu Gly Gln Gly Leu
 305 310 315 320
 Gly Asn Ile Ala Ala Pro Phe Phe Gly Gly Ile Thr Ala Thr Ala Ala
 325 330 335
 Ile Ala Arg Ser Ala Ala Asn Val Arg Ala Gly Ala Thr Ser Pro Ile
 340 345 350
 Ala Ala Val Val His Ser Leu Leu Val Leu Leu Thr Leu Leu Val Leu
 355 360 365
 Ala Pro Met Leu Ser Tyr Leu Pro Leu Ala Ala Met Ser Ala Ile Leu
 370 375 380
 Leu Ile Val Ala Trp Asn Met Ser Glu Ala His Lys Val Val Asp Leu
 385 390 395 400
 Ile Arg His Ala Pro Lys Asp Asp Ile Ile Val Met Leu Leu Cys Leu
 405 410 415
 Ser Leu Thr Val Leu Phe Asp Met Val Arg Arg Asp His Tyr Arg His
 420 425 430
 Cys Ala Gly Ile Thr Pro Val Tyr Ala Gln Asn Cys Gln Tyr Asp Ser
 435 440 445
 Asn Gln His Val Ile Phe Asn Lys Arg Gly Glu Arg Val Ile Gly Arg
 450 455 460
 Thr Asn
 465

<210> 45

<211> 125

<212> PRT

<213> Xenorhabdus bovienii

<400> 45

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Glu | Ser | Ile | Gly | Ala | Lys | Thr | Ser | Asn | Val | Asn | Asn | Thr | Ser | Arg | Glu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Cys | Thr | Thr | Ala | Ala | Ile | Gly | Glu | Val | Ala | Pro | Ala | Arg | Thr | Leu | Ala |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Ala | Glu | Arg | Ala | Ile | Ala | Ala | Val | Ala | Val | Met | Pro | Pro | Lys | Lys | Gly |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Ala | Ala | Ile | Leu | Pro | Asn | Pro | Trp | Pro | Ser | Ser | Ser | Pro | Leu | Glu | Trp |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Cys | Phe | Phe | Pro | Val | Ile | Pro | Ser | Arg | Ile | Thr | Ala | His | Ser | Asn | Asp |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Ser | Ile | Ala | Pro | Ser | Met | Ala | Ile | Glu | Asn | Ala | Ala | Gly | Ser | Asn | Ala |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Asp | Thr | Val | Phe | Gln | Leu | Ile | Ser | Arg | Glu | Cys | Val | Ser | Gly | Lys | Phe |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| His | Gly | Arg | Thr | Asn | Trp | Gly | Arg | Met | Gly | Gly | Met | Pro | | | |
| | | 115 | | | | | 120 | | | | | 125 | | | |

<210> 46

<211> 161

<212> PRT

<213> Xenorhabdus bovienii

<400> 46

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Leu | Ser | Tyr | Ser | Ile | Trp | Ser | Val | Ala | Ile | Thr | Ile | Gly | Ile | Val | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| Ala | Ser | Leu | Leu | Phe | Met | Arg | Lys | Ile | Ala | Asn | Met | Thr | Arg | Ile | Ser |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Thr | Ser | Ser | Leu | Thr | Ser | Ala | Glu | Lys | Gly | Leu | Leu | Val | Val | Arg | Ile |
| | | 35 | | | | | 40 | | | | | 45 | | | |
| Asn | Gly | Pro | Leu | Phe | Phe | Ala | Ala | Ala | Glu | Arg | Ile | Phe | Ala | Glu | Leu |
| | 50 | | | | | 55 | | | | | 60 | | | | |
| Arg | Glu | Lys | Ser | Ala | Asp | Tyr | Gln | Thr | Ile | Ile | Met | Gln | Trp | Asp | Ala |
| 65 | | | | | 70 | | | | | 75 | | | | 80 | |
| Val | Pro | Val | Leu | Asp | Ala | Gly | Gly | Leu | His | Ala | Phe | Gln | Gly | Phe | Val |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Arg | Glu | Leu | Gly | Lys | Glu | Lys | His | Ile | Val | Val | Cys | Asp | Ile | Pro | Phe |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Gln | Pro | Leu | Lys | Thr | Leu | Ala | Arg | Ala | Lys | Val | Met | Pro | Ile | Glu | Gly |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Glu | Leu | Ser | Phe | Tyr | Ala | Thr | Leu | Pro | Lys | Ala | Leu | Lys | Glu | Met | Ala |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Val | Asp | Tyr | Thr | Pro | Glu | Val | Cys | Ala | Ser | Ser | Glu | Lys | Ile | Gln | Gly |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Gln | | | | | | | | | | | | | | | |

<210> 47

<211> 173

<212> PRT

<213> Xenorhabdus bovienii

<400> 47

| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Cys | Met | Ser | Asp | Val | Glu | Asn | Asp | Arg | Arg | Thr | Leu | Gly | Ser | Leu | Leu |
| 1 | | | | 5 | | | | | 10 | | | | | 15 | |
| His | Asp | Thr | Glu | Ala | Gln | His | Val | Asn | His | Gln | Ile | Val | Ile | Thr | Lys |
| | | | 20 | | | | | 25 | | | | | 30 | | |
| Val | Ala | Ala | Thr | Val | Thr | Gln | Asp | His | Leu | Val | Ile | Ala | Ala | Phe | Phe |

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      35              40              45
Glu Phe Phe Asn Asn Ile Ala His Leu Pro Arg Ala Asn Lys Leu Trp
   50              55              60
Phe Phe Asn Ile Asn His Ser Thr Gly Phe Arg His Arg Phe Asn Gln
  65              70              75              80
Ile Gly Leu Ala Gly Lys Glu Gly Trp Lys Leu Asn His Ile His His
      85              90              95
Ile Arg Asp Trp Leu Ser Leu Cys Arg Leu Met His Val Ser Asp Asn
      100              105              110
Phe His Ala Glu Gly Leu Phe Gln Phe Leu Lys Asp Phe His Pro Leu
      115              120              125
Phe Gln Pro Trp Pro Thr Ile Arg Ala Asp Arg Arg Thr Val Ser Leu
      130              135              140
Ile Lys Arg Arg Phe Lys Asn Ile Arg Asn Ala Gln Phe Leu Cys His
  145              150              155              160
Gly Asp Ile Val Leu Thr Asn Pro His Gly Gln Ile Pro
      165              170

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<210> 48

<211> 308

<212> PRT

<213> Xenorhabdus bovienii

<400> 48

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Leu Ser Cys Ile Arg Phe Ile Phe Leu Leu Ile Gln Gln Ile Tyr Leu
  1              5              10              15
Pro Leu Thr Arg Glu Gly Ile Ser Met Gln Gln Lys Val Val Asn Ile
      20              25              30
Gly Asp Ile Lys Val Ala Asn Asp Leu Pro Phe Val Leu Phe Gly Gly
      35              40              45
Met Asn Val Leu Glu Ser Arg Asp Leu Ala Met Arg Ile Cys Glu His
      50              55              60
Tyr Val Thr Val Thr Gln Lys Leu Gly Ile Pro Tyr Val Phe Lys Ala
  65              70              75              80
Ser Phe Asp Lys Ala Asn Arg Ser Ser Ile Arg Ser Tyr Arg Gly Pro
      85              90              95
Gly Leu Glu Glu Gly Met Lys Ile Phe Gln Glu Leu Lys Gln Thr Phe
      100              105              110
Gly Val Lys Ile Ile Thr Asp Val His Glu Pro Ala Gln Ala Gln Pro
      115              120              125
Val Ala Asp Val Val Asp Val Ile Gln Leu Pro Ala Phe Leu Ala Arg
      130              135              140
Gln Thr Asp Leu Val Glu Ala Met Ala Lys Thr Gly Ala Val Ile Asn
  145              150              155              160
Val Lys Lys Pro Gln Phe Val Ser Pro Gly Gln Met Gly Asn Ile Val
      165              170              175
Glu Lys Phe Lys Glu Gly Gly Asn Asp Gln Val Ile Leu Cys Asp Arg
      180              185              190
Gly Ser Asn Phe Gly Tyr Asp Asn Leu Val Val Asp Met Leu Gly Phe
      195              200              205
Gly Val Met Gln Gln Ala Thr Gln Gly Ala Pro Val Ile Phe Asp Val
      210              215              220
Thr His Ala Leu Gln Cys Arg Asp Pro Leu Gly Ala Ala Ser Gly Gly
  225              230              235              240
Arg Arg Ala Gln Val Ala Glu Leu Ala Arg Ala Gly Met Ala Val Gly
      245              250              255
Ile Ala Gly Leu Phe Leu Glu Ala His Pro Asp Pro Glu Asn Ala Lys

```

260 265 270
 Cys Asp Gly Pro Ser Ala Leu Pro Leu Ala Lys Leu Glu Ser Phe Leu
 275 280 285
 Met Gln Ile Lys Ala Ile Asp Asp Val Val Lys Asn Phe Pro Glu Leu
 290 295 300
 Asp Thr Ser Lys
 305

<210> 49
 <211> 274
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 49
 Val Asp Gly Ile Lys Met Lys Pro Ile Val Asn Tyr Glu Phe Asn Asn
 1 5 10 15
 Thr Pro Leu Ile Asp Gly Ile Ile Leu Val Ser Lys Ile Ile Arg Pro
 20 25 30
 Asp Phe Pro Gln Thr Leu Val Ser Glu Gln Leu Thr Ala Leu Val Glu
 35 40 45
 Glu Ala Arg Gln Arg Leu Ser Ser Ile Thr Asp Ser Lys Val Lys Leu
 50 55 60
 Asp Ser Leu Leu Thr Leu Phe Tyr Arg Glu Trp Lys Phe Gly Gly Ala
 65 70 75 80
 Asn Gly Val Tyr Cys Leu Ser Asp Thr Leu Trp Leu Asp Arg Leu Leu
 85 90 95
 His Ser Arg Gln Gly Ser Pro Val Ser Leu Gly Thr Val Phe Thr His
 100 105 110
 Ile Ala Gln Ala Leu Gly Leu Ser Val Gln Pro Val Ile Phe Pro Ile
 115 120 125
 Gln Leu Ile Leu Arg Ile Asp Leu Leu Asp Gln Pro Thr Trp Phe Ile
 130 135 140
 Asn Pro Leu Asn Gly Asp Thr Leu Asn Glu His Thr Leu Asp Val Trp
 145 150 155 160
 Leu Lys Gly Asn Ile Gly Pro Thr Val Arg Leu Lys Lys Gln Asp Leu
 165 170 175
 Gln Glu Ala Asp Asn Val Ser Leu Val Arg Lys Ile Thr Asp Thr Ile
 180 185 190
 Lys Val Ser Leu Met Glu Glu Lys Lys Met Glu Leu Ala Leu Lys Ala
 195 200 205
 Ser Glu Val Val Leu Thr Phe Asp Pro Asp Asp Pro Tyr Glu Ile Arg
 210 215 220
 Asp Arg Gly Leu Ile Tyr Ala Gln Leu Asp Cys Asn His Ile Ala Val
 225 230 235 240
 Ser Asp Leu Ser Tyr Phe Val Glu His Cys Pro Glu Asp Pro Ile Ser
 245 250 255
 Glu Met Ile Lys Met Gln Ile Asn Thr Ile Glu Gln Arg Leu Ile Val
 260 265 270
 Leu His

<210> 50
 <211> 316
 <212> PRT
 <213> Xenorhabdus bovienii

<400> 50

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Ser Asp Arg Arg Gln Thr Gly Tyr Ala Tyr Ser Ala Asp His Tyr Arg
1      5      10      15
Ile Ser Gly Arg Ser Thr Val Cys Thr Val Arg Ala Gly Leu Met Asn
20      25      30
Tyr Gln Cys Trp Leu Gln His Ala Thr Gln Leu Ser Glu Ser Asp
35      40      45
Ser Pro Lys Arg Asp Ala Glu Ile Leu Leu Gly Tyr Val Thr Gly Arg
50      55      60
Ser Arg Thr Tyr Leu Ile Ala Phe Asp Glu Thr Leu Ile Ser Ser Glu
65      70      75      80
Glu Leu His Gln Leu Asp Ser Leu Leu Val Arg Arg Ile Gln Gly Glu
85      90      95
Pro Val Ala Tyr Ile Ile Gly Glu Arg Glu Phe Trp Ser Leu Pro Phe
100     105     110
Ala Val Ser Pro Ala Thr Leu Ile Pro Arg Pro Asp Thr Glu Cys Leu
115     120     125
Val Glu Lys Ala Leu Glu Leu Leu Pro Asp Ser Pro Ala Arg Ile Leu
130     135     140
Asp Leu Gly Thr Gly Thr Gly Ala Ile Ala Leu Ala Leu Ala Ser Glu
145     150     155     160
Arg Asn Asp Cys Tyr Val Thr Gly Val Asp Ile Asn Ser Asp Ala Val
165     170     175
Met Leu Ala Gln His Asn Ala Glu Lys Asn Ala Gly Lys Leu Ala Ile
180     185     190
His Asn Val Asn Phe Leu Gln Ser Glu Trp Phe Ala Ala Val Gly Asn
195     200     205
Gln Gln Phe Asp Met Ile Val Ser Asn Pro Pro Tyr Ile Asp Glu Arg
210     215     220
Asp Pro His Leu Gln Glu Gly Asp Ile Arg Phe Glu Pro Ala Thr Ala
225     230     235     240
Leu Ile Ala Ala Gln Asn Gly Met Ala Asp Leu Gln Ala Ile Val Gly
245     250     255
Gln Ala Arg His Phe Leu Ser Pro Asn Gly Trp Leu Leu Leu Glu His
260     265     270
Gly Trp Lys Gln Gly Thr Val Val Arg Asn Leu Phe Leu Glu Lys Gly
275     280     285
Tyr Gln Gln Ile Ala Thr Phe Gln Asp Tyr Gly Gly Asn Glu Arg Ile
290     295     300
Thr Ile Gly Arg Trp Asn Lys Asn Glu Thr His Ser
305     310     315

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<210> 51

<211> 289

<212> PRT

<213> Xenorhabdus bovienii

<400> 51

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Val Glu Met Arg Glu Met Ala Gln Glu Glu Leu Lys Glu Ala Lys Ile
1      5      10      15
Arg Asn Glu Glu Leu Glu Gln Gln Leu Gln Leu Leu Leu Pro Lys
20      25      30
Asp Pro Asp Asp Glu Arg Asn Cys Phe Leu Glu Val Arg Ala Gly Thr
35      40      45
Gly Gly Asp Glu Ala Ala Ile Phe Ala Gly Asp Leu Phe Arg Met Tyr
50      55      60
Ser Arg Tyr Ala Glu Ala Arg Arg Trp Arg Val Glu Ile Ile Ser Ala
65      70      75      80

```

Asn Glu Gly Glu His Gly Gly Tyr Lys Glu Val Ile Ala Lys Val Ser
 85 90 95
 Gly Asp Gln Val Tyr Gly His Leu Lys Phe Glu Ser Gly Gly His Arg
 100 105 110
 Val Gln Arg Val Pro Glu Thr Glu Ser Gln Gly Arg Ile His Thr Ser
 115 120 125
 Ala Cys Thr Val Ala Val Met Pro Glu Ile Pro Glu Ala Glu Leu Pro
 130 135 140
 Asp Ile Ser Pro Gly Asp Leu Lys Ile Asp Thr Phe Arg Ser Ser Gly
 145 150 155 160
 Ala Gly Gly Gln His Val Asn Thr Thr Asp Ser Ala Ile Arg Ile Thr
 165 170 175
 His Leu Pro Thr Gly Ile Val Val Glu Cys Gln Asp Glu Arg Ser Gln
 180 185 190
 His Lys Asn Lys Ala Lys Ala Met Ser Val Leu Ala Ala Arg Ile Arg
 195 200 205
 Ala Ala Glu Met Arg Lys Arg Gln Glu Val Glu Ala Ser Glu Arg Arg
 210 215 220
 Asn Leu Leu Gly Ser Gly Asp Arg Ser Asp Arg Asn Arg Thr Tyr Asn
 225 230 235 240
 Phe Pro Gln Gly Arg Val Thr Asp His Arg Ile Asn Leu Thr Leu Tyr
 245 250 255
 Arg Leu Asp Glu Val Ile Glu Gly Lys Leu Asp Met Leu Ile Gln Pro
 260 265 270
 Ile Ile Ile Glu Tyr Gln Ala Asp Gln Leu Ser Ala Leu Ser Glu Gln
 275 280 285
 Asp

<210> 52

<211> 37544

<212> DNA

<213> *Xenorhabdus bovienii*

<400> 52

| | | | | | | |
|-------------|------------|-------------|-------------|------------|------------|------|
| ggatcagctg | gtttgccacc | gggatcccca | ccgttgatgc | cctgtagcg | gaggaattct | 60 |
| ggcacggtga | caaacaggct | ttcccgcct | ttacctgccg | ttttacgcat | tttgaccctg | 120 |
| ataaagaaca | ggatgttact | ctcgttccct | cgacggaaga | ggcttattgg | ctgcaccggg | 180 |
| cgttgcaagg | ccaaccgtta | cacagtgagg | tctatggcga | cgatggcacc | gcgcaggcgg | 240 |
| gtatccccta | taccgttatg | gacagtgcgc | cccaggttcg | gcttctgacg | ggtttaccgg | 300 |
| gtaactcacc | gacagtctgg | ccgagtgtga | ttgaacagag | aacctggcag | tacgaacgga | 360 |
| ttgccgatga | tccgcaatgc | catcagcagg | tgggtgctgaa | cagtgaccgc | tacggttttc | 420 |
| cacgggagac | cgtcgacatt | gcttatccgc | gccgccctaa | gcctgcggtg | tcaccttacc | 480 |
| cggatacgt | gccggcgacg | ttattcgaca | gcagctatga | tgagcagcaa | cagcaattgc | 540 |
| ggcttaccgg | gcaacggcaa | cattaccatc | acctgactga | cactgaacat | caagtgtctg | 600 |
| gactgcctga | tgtcatgcca | agcgatgcct | ggggctatcc | ggcagcgcg | gtaccccg | 660 |
| aagggtttcac | cctggaggac | ttgctggcag | agaacagtct | gatagccccg | ggcacgccat | 720 |
| tgacctat | agggcatcaa | cgcggtgctt | ataccggaac | gaccggaacc | gaagaaaaac | 780 |
| cgacccgaca | ggcgctggtg | gcttataccg | aaaccgcggt | ttttgatgaa | ttggccttgc | 840 |
| aggccttta | tggcacattg | agtcctgaag | ccctggaaaa | gaaattaatc | gagtctggtt | 900 |
| atttgtctgt | tccacgcccc | ttcaataccg | gtgcggaatc | ggcgggtctg | gtcgcgccgc | 960 |
| agggatatac | cgattacggc | gggtctgagg | cgttttaccg | tccgttggct | cagcggacga | 1020 |
| cgggtgcagat | tggcaaaaac | accctccatt | gggataccca | ttactgtgcg | gtcgtccgta | 1080 |
| tgcaggatgc | ggcgggtctg | tacacggatg | ccgcctatga | ttaccgcttc | ctgacccccg | 1140 |
| ttcagataac | cgatgccaat | gacaaccagc | aacatatcac | actgaccgcg | ctggggcagg | 1200 |
| tatcatccgg | ccggttctgg | ggcaactgagg | aagggactcc | gcagggttat | acccgcctg | 1260 |
| aagaccgccc | atttacgcca | ccgtcctcag | tggcggaagc | cctcgacttg | aaaccggatc | 1320 |

| | | | | | | |
|-------------|------------|-------------|------------|-------------|-------------|------|
| ttccggttg | caactgcatg | gtttatgcgc | cgctgagttg | gatgccgttg | gcgcacacct | 1380 |
| atcaggaata | tatagccggc | tttacgtggc | aggcactgct | tgacgcgggg | gtagtgcagg | 1440 |
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| | | | | | | |
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